C 21.5: 967/1

Vol. 967 Number 1

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

February 7, 1978

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OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

February 7, 1978 Volume 967 Number 1

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PATENT AND TRADEMARK OFFICE NOTICES

National Inventors Day

The Patent and Trademark Office will be sponsoring National Inventors Day in the Public Search Room on Saturday, February 11, from 1:00 p.m. to 5:00 p.m. and Sunday February 12, 1978 from 10:00 a.m. to 5:00 p.m. The public is invited to view the exhibits on these days and to attend a formal program at 2:00 p.m. on Sunday.

In order to accommodate the exhibits, it will be necessary to close the Public Search Room at 5:00 p.m. on Friday, February 10, 1978.

We would appreciate the cooperation of all users of the Search Room facilities in removing all personal items and belongings in order to permit the early closing time.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

Dec. 7, 1977

Availability of Consolidated Listing

The "Consolidated Listing of Recent Official Gazette Notices—Re Patent and Trademark Office Practices and Procedures," which appeared in the OFFICIAL GAZETTE of January 3, 1978, is available from the Superintendent of Documents, Washington, D.C. 20402. Please include the following information when ordering:

Stock No. 003–004–005–49–1, cost $2.20.

RICHARD J. SHAKMAN,
Assistant Commissioner for Administration.

Jan. 11, 1978.

Abstract of the Disclosure

This notice is intended to announce a change in the examining practice concerning review of the abstract for compliance with the guidelines set forth in MPEP 608.01(b).

At present, the examiner is instructed to review the abstract for compliance with the guidelines when passing the case to issue, making any necessary revisions by examiner's amendment. This policy has led to the necessity for many changes by the examiner which could have and should have been made at an earlier point in the prosecution. For example, abstracts in excess of the 250 word limit require cancellation and/or rewriting of portions thereof. This 250 word limit is strictly enforced since it represents a requirement of the printing process and the printed patent format designed to present a maximum amount of information concerning a patent on a single page.

Effective immediately, examiners are to require correction of the abstract at the earliest point in the prosecution that non-compliance with the guidelines is detected. Applicants are expected to observe the guidelines in drafting the abstract and correct any defect that is identified in an Office action. Applicants are encouraged to make the necessary corrections not only to relieve the examiner of this burden, but also to help avoid any potential conflict with respect to altering the scope of the enabling disclosure. In this regard, it should be noted that the abstract of the disclosure has been interpreted to be a part of the specification for the purposes of compliance with paragraph 1 of 35 USC 112. *In re Armbruster*, 512 F2d 676, 185 USPQ 152 (CCPA 1975). However, although it is preferable for applicant to make any necessary changes, the examiner will retain the authority and responsibility for reviewing, editing and revising the abstract of the disclosure at the time of allowance of the application to assure compliance with the guidelines.

Section 608.01(b) of the Manual of Patent Examining Procedures will be amended appropriately.

WILLIAM FELDMAN,
Deputy Assistant Commissioner for Patents.

Dec. 30, 1977.

Graphical Illustrations in the Specification

For convenience many applicants have been including graphs or other types of graphical illustrations in the text portion of the specification. These illustrations do not come within the purview of 37 C.F.R. 1.58 which permits tables and chemical and mathematical formulas in the specification in lieu of formal drawings. Frequently, these graphical illustrations do not have satisfactory reproduction characteristics. Moreover, these reproductions are generally less than satisfactory due to the fact that the illustrations are usually reduced in size in order to fit a column of the printed patent page. Accordingly, effective immediately, graphs and graphical type illustrations in the specification will be objected to under 37 C.F.R. 1.58(a) and drawings pursuant to 37 C.F.R. 1.81 will be required.

WILLIAM FELDMAN,
Deputy Assistant Commissioner for Patents.

Jan. 12, 1978.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,193,404, Re. S.N. 850,027, Filed Nov. 9, 1977, Cl. 427/38, ASSOCIATED DYE SALTS AND METHOD OF FORMING COLORED INDICIA THEREWITH, Chester Davis, Owner of Record: *S. D. Warren Company, Boston, Mass.*, Attorney or Agent: Rudolf E. Hutz, et al., Ex. Gp.: 162

3,260,106, Re. S.N. 856,197, Filed Nov. 30, 1977, Cl. 73/144, WEB TENSION METER, Richard D. Hull, et al., Owner of Record: *Cleveland Machine Controls, Inc., Cleveland, Ohio,* Attorney or Agent: James H. Tilberry, et al., Ex. Gp.: 244

3,622,318, Re. S.N. 846,241, Filed Oct. 27, 1977, Cl. 96/22, PHOTOGRAPHIC MATERIALS AND PROCESSES, Francis J. Evans, Owner of Record: *Eastman Kodak Company, Rochester, N.Y.,* Attorney or Agent: Carl O. Thomas, et al., Ex. Gp.: 166

3,829,348, Re. S.N. 855,113, Filed Nov. 25, 1977, Cl. 428/11, DECORATIVE THREE-DIMENSIONAL OBJECTS, Jacob Spiegel, et al., Owner of Record: *Gilbreth International Corporation, Philadelphia, Pa.*, Attorney or Agent: A. D. Caesar, et al., Ex. Gp.: 164

3,836,767, Re. S.N. 847,432, Filed Nov. 1, 1977, Cl. 240/25, LIGHTING FIXTURES, Martin L. Lasker, Owner of Record: *Wylain, Inc., Dallas, Tex.*, Attorney or Agent: Joseph M. Lane, et al., Ex. Gp.: 212

3,978,953, Re. S.N. 855,119, Filed Nov. 28, 1977, Cl. 192/84 C, RESILIENT CONNECTION BETWEEN INNER AND OUTER POLES ON ELECTROMAGNETIC CLUTCH, Donald Leroy Miller, Owner of Record: *Facet Enterprises, Inc., Tulsa, Okla.*, Attorney or Agent: Remy J. Van Ophem, Ex. Gp.: 345

4,010,261, Re. S.N. 853,790, Filed Nov. 21, 1977, Cl. 424/177, METHOD TO PREVENT REPRODUCTION WITH [DES-GLY]^{10}-GN-RH NONAPEPTIDE AMIDE ANALOGS IN POSITION 6, Edwin Samuel Johnson, et al., Owner of Record: *Abbott Laboratories, North Chicago, Ill.*, Attorney or Agent: Paul D. Burgauer, et al., Ex. Gp.: 124

PATENT NOTICES

Certificates of Correction for the Week of Feb. 7, 1978

Re. 28,990	4,036,608	4,046,522	4,052,175
3,491,787	4,037,370	4,046,610	4,052,198
3,860,787	4,037,960	4,046,901	4,052,209
3,870,777	4,038,036	4,046,903	4,052,269
3,871,003	4,038,199	4,047,294	4,052,277
3,878,163	4,038,284	4,047,517	4,052,290
3,928,418	4,038,636	4,047,866	4,052,385
3,946,242	4,039,138	4,047,870	4,052,479
3,953,790	4,039,925	4,047,961	4,052,608
3,967,975	4,040,328	4,048,020	4,052,611
3,976,546	4,040,503	4,048,296	4,052,683
3,977,191	4,040,613	4,048,302	4,053,311
3,980,691	4,040,633	4,048,526	4,053,376
3,981,880	4,040,719	4,048,842	4,053,682
3,983,153	4,041,474	4,049,197	4,053,725
3,983,154	4,041,696	4,049,239	4,053,802
3,987,083	4,041,756	4,049,488	4,053,808
3,995,643	4,041,995	4,049,528	4,053,864
3,997,551	4,042,077	4,049,608	4,053,973
3,997,552	4,042,137	4,049,676	4,053,979
3,997,587	4,042,335	4,049,835	4,054,057
4,003,966	4,042,608	4,049,971	4,054,066
4,005,115	4,042,780	4,050,109	4,054,138
4,005,606	4,043,499	4,050,121	4,054,211
4,007,448	4,043,592	4,050,151	4,054,264
4,011,133	4,043,724	4,050,210	4,054,282
4,014,707	4,043,926	4,050,223	4,054,330
4,021,502	4,044,007	4,050,250	4,054,472
4,023,612	4,044,025	4,050,486	4,054,511
4,025,521	4,044,057	4,050,575	4,054,532
4,026,989	4,044,059	4,050,724	4,054,745
4,027,230	4,044,103	4,050,928	4,055,178
4,027,555	4,044,180	4,050,950	4,055,462
4,028,387	4,044,227	4,051,076	4,055,670
4,028,467	4,044,249	4,051,130	4,055,677
4,032,491	4,044,604	4,051,169	4,055,715
4,032,762	4,044,691	4,051,236	4,055,927
4,032,876	4,044,699	4,051,508	4,055,976
4,033,439	4,044,718	4,051,623	4,056,002
4,033,652	4,045,498	4,051,631	4,056,155
4,034,972	4,045,607	4,051,723	4,056,571
4,035,623	4,045,703	4,052,028	4,056,585
4,035,872	4,046,347	4,052,080	4,057,226
4,036,241	4,046,369	4,052,103	4,060,848

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JANUARY 14, 1978

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	5-9-77
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	2-11-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	7-14-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	1-10-77
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	3-7-77
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	9-13-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	8-2-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	2-7-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	5-20-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	9-3-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	5-6-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	1-3-77
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	4-4-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	1-3-77
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	1-6-77
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	4-22-77

Expiration of patents: The patents within the range of numbers indicated below expire during January 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,966,681 to 2,970,312, inclusive
Plant Patents..... Numbers 2,009 to 2,018, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED FEBRUARY 7, 1978

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T967,001

AUSTENITIC Ni-Fe BASE WELD MATERIAL

Robert S. Brown, Leesport, and Joseph B. Koch, Sinking Spring, both of Pa., assignors to Carpenter Technology Corporation, Reading, Pa.

Filed Apr. 28, 1977, Ser. No. 791,786
Int. Cl.[2] C22C *30/02*
U.S. Cl. 75—122
No Drawing. 11 Pages Specification

Weld-filler material particularly useful in providing enhanced freedom from weld cracking in fully austenitic Fe—Ni—Cr—Mo—Cu material in which the elements P, Cb, Ce+La, C, Si, S, N and O are controlled to low levels and in which the level of manganese is increased to at least 1% and preferably to at least 1.5%. The weld-filler material in weight percent contains:

Carbon—0.035 Max.
Manganese—1–4.0
Silicon—0.20 Max.
Phosphorus—0.020 Max.
Sulfur—0.005 Max.
Chromium—19.0–26.0
Nickel—32.5–38
Molybdenum—2–9
Copper—3.0–4.0
Columbium—0.35 Max.
Cerium—0.01 Max.
Boron—0.0035 Max.

the balance being iron and in which cerium includes cerium plus lanthanum or misch metal.

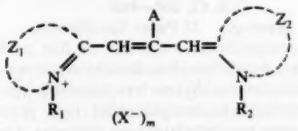
T967,002

SPECTRALLY SENSITIZED SILVER HALIDE PHOTOGRAPHIC EMULSIONS

Yuji Mihara; Takeo Sakai; Hideki Ohmatsu, and Akira Sato, all of No. 210, Nakanuma, Minami-ashigara, Kanagawa, Japan

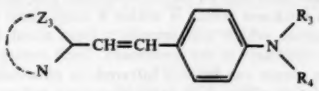
Filed July 14, 1977, Ser. No. 815,751
Claims priority, application Japan, July 14, 1976, 51-84320
Int. Cl.[2] G03C *5/24*
U.S. Cl. 96—64
1 Sheets Drawing. 62 Pages Specification

An internal latent image type silver halide photographic emulsion suitable for use in a light-sensitive material for the diffusion transfer process and which provides a direct positive image by surface development in the presence of a fogging agent, which emulsion is spectrally sensitized with a supersensitizing combination of at least on sensitizing dye represented by the following general formula (I)



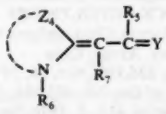
(I)

werein Z_1 represents a non-metallic atomic group necessary to complete a benzoxazole ring, a naphthoxazole ring, a benzothiazole ring, a naphthothiazole ring, a benzoselenazole ring or a benzimidazole ring; Z_2 represents a non-metallic atomic group necessary to complete a benzothiazole ring, a naphthothiazole ring or a benzoselenazole ring; A represents a hydrogen atom or an alkyl group; R_1 and R_2, which may be the same or different, each represents an alkyl group or a substituted alkyl group; X represents an acid anion; and m represents 0 or 1, and at least one sensitizing dye represented by the following general formula (II), (III) or (IV):



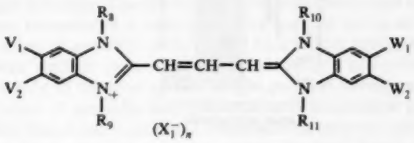
(II)

wherein Z_3 represents a non-metallic atomic group necessary to complete a 5- or 6-membered heterocyclic ring; and R_3 and R_4, which may be the same or different, each represents an alkyl group;



(III)

wherein Z_4 represents a non-metallic atomic group necessary to complete a 5- or 6-membered heterocyclic ring; and R_5 represents an alkyl group; R_6 represents an alkyl group or a substituted alkyl group; R_7 represents a hydrogen atom or R_6 and R_7 can combine and form a ring and Y represents an oxygen atom or =N—R_8, wherein R_8 represents a hydrogen atom, an alkyl group or an aryl group,



(IV)

wherein V_1, V_2, W_1 and W_2, which may be the same or different, each represents a hydrogen atom, a halogen atom, a trifluoromethyl group, a cyano group, a carboxy group, an alkoxycarbonyl group, an aminosulfonyl group or an alkylsulfonyl group; R_8, R_9, R_{10} and R_{11}, which may be the same or different, each represents an alkyl group or a substituted alkyl group; X_1 represents an acid anion; and *n* represents 0 or 1.

T967,003

FLOORING OF WOOD-PLASTIC COMPOSITE

Alvin E. Witt, 300 Steeplechase Drive, Media, Pa. 19063, and Homer Breault, Pine Glen, Pa. 16845

Continuation of Ser. No. 684,514, May 7, 1976, abandoned. This application Apr. 4, 1977, Ser. No. 784,009
Int. Cl.[2] B32B *5/12, 7/02, 27/40*
U.S. Cl. 428—113
No Drawing. 15 Pages Specification

Wood is disintegrated to prepare a mass of wood fibers which are formed into a mat. A unique hardboard is prepared by compressing a preformed mat comprising thermoplastic resins, wood fibers and wood fibers coated with such resins. The hardboard has a resin content of from about 37% to about 39% and a wood fiber content from about 53% to about 57%. The moisture content of the hardboard is ordinarily within a range

from about 4% to about 10%, but such moisture content has the range expected for wood products under a wide range of temperatures, humidities, pressures and related variables. The thickness of the hardboard must be within the range from 790 to 850 microns and the density of the hardboard must be within the range from 690 to 750 milligrams per cubic centimeter. Heretofore such hardboard has been proposed for use as a facing lamina in multilamina composites for covering up various irregularities in the surface of the adjacent lamina while preserving a smooth facing surface.

This hardboard having said 790 to 850 micron thickness is cut into tiles suitable for flooring and a plurality of tiles are directed through a coating zone in which an upper surface of each tile is coated with a precursor for a polyurethane. The thus coated tiles are advanced into a curing zone in which the coating is transformed into an attrition resistant polyurethane layer having a thickness which is within a range from about 110 to 300 microns, which corresponds to from about 1/7 to about $\frac{1}{3}$ of the thickness of the hardboard. Such curing zone suitable for the plastic can employ infrared, or ultraviolet, or equivalent radiation effective in promoting such polymerization to the polyurethane attrition resistant top layer of the multilaminar tile.

T967,004

TRANSPARENT IMPACT POLYSTYRENE PLASTICS OF DI-BLOCK COPOLYMERS

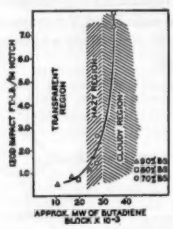
Robert Clarence Smith, Warren, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 636,198, Nov. 28, 1975, abandoned, which is a continuation of Ser. No. 483,191, June 26, 1974, abandoned. This application Aug. 2, 1976, Ser. No. 710,839

Int. Cl.[2] C08F *236/10, 4/48*

U.S. Cl. 526—173

No Drawing. 13 Pages Specification



A transparent di-block copolymer of styrene and butadiene is produced which contains 70 to 90 percent of block styrene, or preferably 75 to 85 percent of block styrene. The copolymer is suitable for use in the manufacture of packaging films and molded items, including egg cartons, boxes of various types, window panes, etc.

T967,005

CELLULOSE REAGENTS INCORPORATING T-AMINO GROUPS

Clinton P. Wade, Jefferson, and Stanley P. Rowland, New Orleans, both of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 625,722, Oct. 24, 1975, Pat. No. 4,017,259. This application Feb. 15, 1977, Ser. No. 768,809

Int. Cl.[2] C07D *251/08;* **C07C** *125/06*

U.S. Cl. 544—220

No Drawing. 28 Pages Specification

Durable press properties are imparted to cellulosic fabrics by reacting with either of two new tertiary amino-N-methylol reagents. Autocatalysis was shown by these reagents when applied as the free bases or as hydrochlorides to cotton fabric by conventional methods. Resilience, recurability, improved scorch resistance, and enhanced dye and brightener sorptions are realized.

T967,006

THERMAL CONSERVATION ASSEMBLY FOR ROLLER FUSER

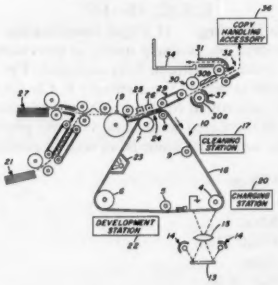
Edwin Clarence Hoffman, 901 Elmgrove Road, Rochester, N.Y. 14650

Filed July 25, 1977, Ser. No. 818,372

Int. Cl.[2] H05B *1/00;* **G03G** *15/20*

U.S. Cl. 219—216

2 Sheets Drawing. 9 Pages Specification



In an electrophotographic copier including a fuser having a heated fuser roller, a thermal conservation assembly for minimizing thermal losses and facilitating roller maintenance and removal. The assembly includes first and second heat reflective members which are mounted for pivotal movement between a first position wherein the members are in close proximity with the fuser roller in order to minimize thermal losses and a second position wherein said members are out of proximity with said roller in order to facilitate access to the roller for maintenance and removal. In roller fusers having a pair of heated fuser rollers such as for duplex copy fusing, each roller is provided with a movable thermal conservation assembly.

T967,007

COMPOSITIONS OF POLYESTERS HAVING FINE PARTICLES OF POLY (1,4-CYCLOHEXYLENE-DIMETHYLENE TEREPHTHALATE) DISPERSED THEREIN

David R. Fagerburg, 3812 Cimarron Drive; Burns Davis, 2019 Bruce St., both of Kingsport, Tenn. 37664, and Willis C. Wooten, 521 Lakewood Rd., Kingsport, Tenn. 37660

Continuation of Ser. No. 664,842, March 8, 1976, abandoned. This application Oct. 13, 1976, Ser. No. 731,877

Int. Cl.[2] C08L *67/02*

U.S. Cl. 260—860

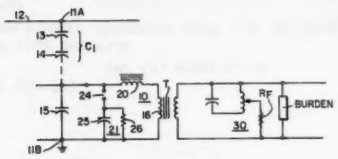
No Drawing. 22 Pages Specification

Disclosed are compositions comprised of fine particles of unannealed poly(1,4-cyclohexylenedimethylene terephthalate) dispersed in a poly(tetramethylene terephthalate) type polyester, a poly(pentamethyleneterephthalate) type polyester, a poly(hexamethylene terephthalate) type polyester, a poly(1,4-cyclohexylenedimethylene terephthalate/isophthalate) type polyester, a poly(tetramethylene terephthalate) type polyester modified with poly(alkylene oxide)glycol, a poly(1,4-cyclohexylenedimethylene terephthalate) type polyester modified with poly(alkylene oxide) glycol or a polyester prepared from 1,4-cyclohexanedicarboxylic acid, dimer acid, and 1,4-cyclohexanedimethanol.

T967,008
CAPACITIVE VOLTAGE TRANSFORMER WITH IMPROVED FERRORESONANCE PROTECTION DEVICE

Andrew S. Sweetana, Jr., Bloomington; Frederick J. Brown, Ellettsville, and Gerald B. Boyette, Bloomington, all of Ind., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 631,298, Jan. 12, 1975, abandoned. This application Apr. 7, 1977, Ser. No. 785,380
Int. Cl.² G05F *3/06*
U.S. Cl. 323—61
1 Sheets Drawing. 7 Pages Specification



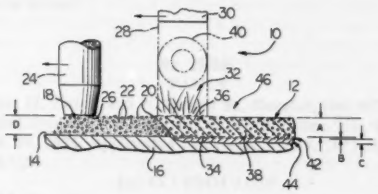
A coupling capacitor protection device with a voltage limiter connected across the tap capacitor feeding the induction transformer primary winding. The suppressor is a ceramic oxide nonlinear resistor changing from high to low resistance, thereby limiting the tap voltage to less than that at which the induction transformer core saturates in order to minimize ferroresonance in the circuit. Also, the limiter gives voltage protection to the tap capacitor circuit.

T967,009
METHOD OF APPLYING A WEAR-RESISTANT COMPOSITE COATING TO AN ARTICLE

Preston L. Gale, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 643,546, Dec. 22, 1975, abandoned. This application Apr. 7, 1977, Ser. No. 785,631
Int. Cl.² C21D *1/34*
U.S. Cl. 427—53
1 Sheets Drawing. 17 Pages Specification

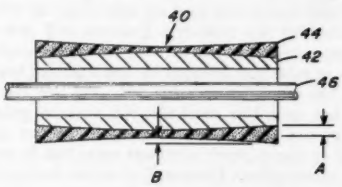
A method of applying a wear-resistant composite coating to an article is disclosed which includes the steps of depositing a plurality of wear-resistant particles having a predetermined melting point along with a lower melting point element in solid form onto the surface of the article, focusably directing a coherent beam of electromagnetic energy thereon at a power density level sufficient to melt the element and a limited surface portion of the article while retaining the particles in substantially solid form, and removing the beam therefrom to allow solidification of the melted portion thereof into a matrix in which the wear-resistant particles are embedded. Advantageously this method provides a thin diffusion zone and a hardened zone underneath it to better support the coating.



T967,010
FUSER ROLLER

Walter Anthony Stryjewski, 901 Elmgrove Road, Hilton, N.Y. 14650

Filed June 27, 1977, Ser. No. 810,258
Int. Cl.² G03G *5/00*
U.S. Cl. 432—60
1 Sheets Drawing. 9 Pages Specification



In an electrophotographic copier a fuser roller for fusing images to a copy. The fuser roller includes an inner rigid core of heat transmissive or heat conductive material having an outer surface of generally dome-shaped longitudinal profile and an outer resilient cover having an inner surface generally conforming to the outer surface of said core and having an outer surface of generally hour-glassed shaped longitudinal profile. The fuser roller is provided with a heating element internal to the inner core. In a duplex copier, identical fusing rollers forming a roller pair are provided to fuse images to both sides of a copy.

REISSUES

FEBRUARY 7, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,531
GRINDING MACHINE

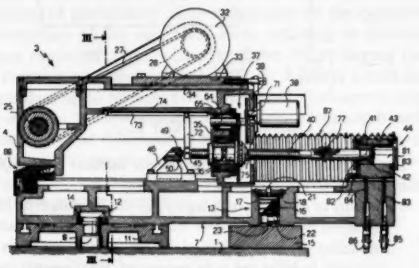
Elio Pagella, and Carlo Guerci, both of Ivrea, Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Original No. 3,932,961, dated Jan. 20, 1976, Ser. No. 417,904, Nov. 21, 1973. Division of Ser. No. 194,325, Nov. 1, 1971, Pat. No. 3,818,643. Application for reissue Jan. 4, 1977, Ser. No. 756,691

Claims priority, application Italy, Oct. 30, 1970, 70613/70; Oct. 30, 1970, 70614/70

Int. Cl.[2] B24B *49/18*

U.S. Cl. 51—165.8 **7 Claims**



1. In a grinding machine having a frame, a wheelhead mounted on said frame, a wheel spindle rotatably mounted on said wheelhead, and a grinding wheel having a grinding surface secured to said spindle, a workhead adjustably mounted on said frame, said workhead comprising:

a work spindle for holding a workpiece carried by said workhead, said work spindle being carried by bearings mounted on said workhead,

means for mounting said work spindle for rotatable and axial movement with respect to said grinding surface whereby said workpiece can be oriented with respect to said grinding surface and brought into contact with said grinding surface,

power means for rotating said work spindle,

a screw element having threadably mounted thereon a nut element, said nut element and said screw element being mounted for relatively rotatable movement with respect to one another to displace said elements axially with respect to one another, said nut element having outer teeth and being rotatably mounted on said workhead and fixed against axial movement with respect to said workhead, said work spindle being coaxial with said nut element and passing through said nut element, said screw element comprising the outer surface of a first ring movable axially,

a second ring attached to said work spindle and rotatably and axially movable therewith, said second ring being engageable by said first ring to cause axial movement of said work spindle, and

means for rotating said screw element and said nut element with respect to one another comprising a step-by-step reversible electric motor carried by said workhead and having an output shaft means rotatable by a predetermined number of electric pulses, said output shaft means directly rotatably engaging said outer teeth of said nut element whereby rotation of said nut element by said output shaft means results in axial movement of said work spindle with respect to said workhead.

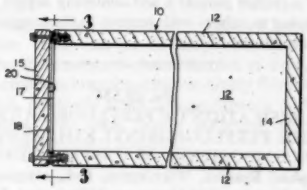
Re. 29,532
VAULT

William H. Zwick, 415 N. Second St., Decatur, Ind. 46733

Original No. 3,983,667, dated Oct. 5, 1976, Ser. No. 540,979, Jan. 14, 1975. Application for reissue Feb. 8, 1977, Ser. No. 766,713

Int. Cl.[2] E04H *13/00*

U.S. Cl. 52—140 **5 Claims**



1. [A burial] *A* vault, comprising an elongated hollow chamber having at least one open end, an end plate closing said open end, [an annular] *a* resilient seal interposed between said chamber and end plate for sealing the space therebetween, said seal having a pair of opposed side faces in engagement with said end plate and chamber and inner and outer faces extending between said side faces, said inner and outer faces having opposed grooves formed therein and extending the lengths of said inner and outer faces, means in said seal for retaining said seal in its [annular] configuration, connecting means for rigidly connecting said end plate to said chamber, and means for fixedly mounting said seal on said end plate.

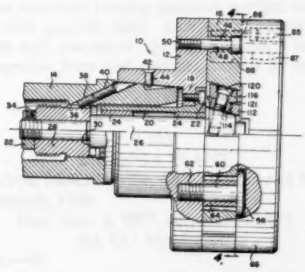
Re. 29,533
SELF-CENTERING JAW CHUCK

Hubert J. Parsons, Belleair Beach, Fla., assignor to Hardinge Brothers, Inc., Elmira, N.Y.

Original No. 3,834,720, dated Sept. 10, 1974, Ser. No. 330,437, Feb. 7, 1973. Application for reissue Mar. 14, 1975, Ser. No. 558,298

Int. Cl.[2] B23B *31/10*

U.S. Cl. 279—1 L **14 Claims**



1. A radially reciprocating jaw chuck for machine tools and the like comprising:

a. a chuck body member,

b. a plurality of master jaws,

c. each of said master jaws *being symmetrical about a radial line pasing through the center thereof and* further having a [pair of circumferentially spaced] fixed [portions]

portion rigidly secured to said body member and a radially reciprocable portion [positioned circumferentially between said fixed portions],

d. *a pair of leaf members* resilient [means] integral with and connecting said fixed [portions] *portion* and said radially reciprocable portion *and chordally disposed with respect to said body member,*

e. work gripping members secured to each of said radially reciprocable portions,

f. cam means axially reciprocable in said body member [for] *operable to* radially [reciprocating] *reciprocate* said radially reciprocable portions and associated work gripping members between work gripping and release positions,

g. whereby the flexure of said resilient [means provides] *leaf members provide* a self-centering action of said work gripping members with respect to the longitudinal axes of the chuck and the work.

Re. 29,534

PURIFICATION OF PERFLUOROSULFONYL FLUORIDE PERFLUOROVINYL ETHERS BY THERMAL DECOMPOSITION OF UNSTABLE ISOMERS

Paul Raphael Resnick, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Original No. 3,821,297, dated June 28, 1974, Ser. No. 281,988, Aug. 18, 1972. Continuation-in-part of Ser. No. 44,111, June 8, 1970, abandoned. Application for reissue June 28, 1976, Ser. No. 700,068

Int. Cl.[2] **C07C** *143/08, 143/70*

U.S. Cl. 260—543 F **3 Claims**

3. In the process for the preparation of perfluorosulfonyl fluoride perfluorovinyl ethers having the formula $ROCF{=}CF_2$, *where R is a sulfonyl fluoride containing fluorocarbon group of three to 15 carbon atoms which may optionally contain one or more ether linkages or chlorogroups with the proviso that the carbon atom of R bonded to the oxygen is also bonded only to atoms from the class consisting of carbon and fluorine, wherein mixtures of the primary isomer and other isomer thereof having the same number of fluorine and oxygen atoms per molecule as the primary isomer are present, the improvement comprising an additional heating of said mixture consisting essentially of said isomers at a temperature of between 250°-350° to selectively destroy said other isomer and separating the purified primary isomer from the products of the destroyed isomer, the* $—OCF{=}CH_2$ *group of the primary isomer being connected to a* CF_2 *group in R and the* $—OCF{=}CF_2$ *group of said other isomer being connected to a secondary or tertiary carbon atom.*

Re. 29,535

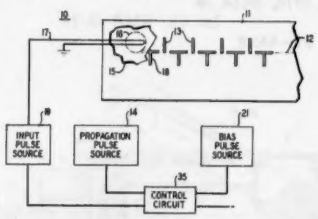
SINGLE WALL DOMAIN NUCLEATOR

Yu-Ssu Chen, New Providence; Joseph Edward Geusic, Berkeley Heights; Terence John Nelson, New Providence, and Herbert Meyer Shapiro, Bridgewater, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Original No. 3,789,375, dated Jan. 29, 1974, Ser. No. 303,327, Nov. 3, 1972. Application for reissue Mar. 13, 1975, Ser. No. 558,140

Int. Cl.[2] **G11C** *19/08*

U.S. Cl. 365—11 **16 Claims**



12. A device for generating magnetic bubbles in a wafer of a magnetic material, said device comprising:

a plurality of elements of a highly permeable magnetic material overlayed on the wafer of a magnetic material and outwardly extending from a localized region of the wafer in which magnetic bubbles are to be generated, the elements operating in response to an applied rotating magnetic field to provide a first magnetic field in the localized region of the wafer,

the magnitude of this first magnetic field being insufficient to induce a reversal of the direction of the magnetization in the wafer, and

a current line overlayed on the wafer and positioned so that a portion of the current line forms a loop-like segment around said localized region of the wafer, for providing a second magnetic field in said localized region of the wafer whenever a current is pulsed through the current line,

the combined magnitudes of the first and second magnetic fields being sufficient to induce a reversal of the direction of the magnetization in said localized region of the wafer.

PLANT PATENTS

GRANTED FEBRUARY 7, 1978

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,206
CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Grantsville, W. Va., and William E. Duffett, Salinas, Calif., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Feb. 4, 1977, Ser. No. 765,431
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—75 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium,* Ramat. known by the cultivar name Popcorn and characterized particularly as to uniqueness by the combined characteristics of flat capitulum form, reflexing at maturity; pompon capitulum type; white ray floret color, tinging pink with finishing temperatures below 56° F; diameter across face of capitulum up to 50 mm; permanence of inflorescence ranging from 14 to 21 days;medium plant height; spreading branching pattern; good tolerance of inflorescence to frost damage; average natural season flowering date of September 25; and average flowering response of 7 weeks in photoperiodic controlled flowering programs.

4,207
KALANCHOE PLANT

James C. Mikkelsen, Ashtabula, OH, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Feb. 8, 1977, Ser. No. 766,579
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of kalanchoe plant known by the cultivar name Nugget and characterized particularly as to novelty by the combined characteristics of vigorous, strong, upright growth; excellent branching; capable of superior cutting production, and fast and uniform propagation; sharp, golden orange flower color, with the flowers being supported on strong stems; and compact and small foliage.

4,208
AFRICAN VIOLET PLANT

Reinhold Holtkamp, Wertherstrasse 112, 4294 Isselburg, Germany

Filed Feb. 8, 1977, Ser. No. 766,580
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—69 **1 Claim**

1. A new and distinct cultivar of African violet plant known by the cultivar name Florida and particularly characterized as to uniqueness by the combined characteristics of compact and floriferous flower bouquet, with the flower being supported on strong, upright flower stems; fast and vigorous growth; uniform blooming; non-dropping flowers, and the bouquet being above the leaves which spread radially outward from the center of the plant.

4,209
KALANCHOE PLANT

James C. Mikkelsen, Ashtabula, Ohio, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Feb. 8, 1977, Ser. No. 766,737
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of kalanchoe known by the cultivar name Pixie and particularly characterized as to uniqueness by the combined characteristics of slow, compact growth and excellent branching habits; highly floriferous, with well clustered, relatively small orange flowers; eight to nine week flowering time after flower initiation, and superior flower and foliage keeping qualities.

4,210
BEGONIA PLANT

James C. Mikkelsen, Ashtabula, Ohio, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Feb. 17, 1977, Ser. No. 769,690
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of begonia plant known by the cultivar name Flambeau and particularly characterized as to uniqueness by the combined characteristics of bright red flower color, dark green foliage having thick blades and heavy texture; consistent propagation by leaf cuttings; relatively large flower size and tepal quantity with the tepal edges being ruffled; vigorous and upright growth habit, and by its resistance to powdery mildew.

4,211
BEGONIA PLANT

James C. Mikkelsen, Ashtabula, Ohio, assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Feb. 17, 1977, Ser. No. 769,843
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of begonia plant known by the cultivar name Pink Fantasy and particularly characterized as to uniqueness by the combined characteristics of light pink flower color, excellent keeping qualities; upright, compact and relatively slow growth habit; excellent appearance due to flower form and placement against the foliage background; good propagation from leaf cuttings, and by its resistance to disease.

4,212
BEGONIA PLANT

Leslie Woodriff, McKinleyville, Calif., assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Mar. 1, 1977, Ser. No. 773,317
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of begonia plant known by the cultivar name Leprechaun and particularly characterized as to uniqueness by the combined characteristics of leaf coloration and color pattern, with the leaves having clear brown areas surrounding the veins and bright green areas between the veins; leaves having spirals at the base and short petioles; short growth habit and relatively slow propagation time and growth rate; superior hardiness, and generally insignificant flowering from a commercial standpoint.

PATENTS

GRANTED FEBRUARY 7, 1978

ERRATA

For CLASS	See PATENT NO.
250–445 T	4,072,289
366–337	4,072,296
366–287	4,072,297
219–121 EB	4,072,356
339–125 R	4,072,401
339–136 M	4,072,402
051–215 H	4,072,476
062–131	4,072,486
062–244	4,072,487
062–282	4,072,488
429–070	4,072,540
424–308	4,072,705
358–284	4,072,818
219–137.31	4,072,828
364–424	4,072,850
364–487	4,072,851
235–312	4,072,853
362–101	4,072,855
362–002	4,072,856
362–123	4,072,857
365–233	4,072,932

PATENTS

GRANTED FEBRUARY 7, 1978

NOTE—Cross reference listings of applications published under the first and second Trial Voluntary Protest Programs are located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,071,912
LIGHT FILTER FOR WELDER'S MASK

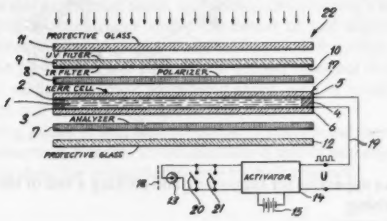
Hermann Budmiger, Seewen, Solothurn, Switzerland, assignor to Revue Thommen AG, Waldenburg, Switzerland

Filed Dec. 2, 1975, Ser. No. 637,000

Claims priority, application Switzerland, Dec. 2, 1974, 16064/74; July 14, 1975, 9265/75

Int. Cl.[2] A61F *9/06*

U.S. Cl. 2—8 **1 Claim**



1. A welder's eyeshield comprising:

a headpiece;

a window on said headpiece alignable with the eyes of a person wearing same;

an infrared filter in said window;

an ultraviolet filter in said window in line with said infrared filter;

a polarizer in said window in line with said filters;

an analyzer in said window in line with and behind said polarizer;

means including an optoelectric element in said window between said polarizer and said analyzer electrically energizable for rotating the plane of polarization of light passing from said polarizer toward said analyzer;

a photocell on said headpiece for generating an output on detection of strong ultraviolet radiation;

an acoustical device on said headpiece responsive to sound;

circuit means between said element and said photocell for operating same to reduce light passage through said window on generation of said output, said circuit means including means responsive to said acoustic device for operating said element to reduce light passage through said window upon detection of a sound by said device attributable to the striking of a welding arc; and

a battery on said headpiece for powering said circuit means.

4,071,913
PROTECTIVE GLOVES

Michael H. Rector, Santa Rosa, Calif., assignor to Rector & Wolfe Incorporated, Santa Rosa, Calif.

Continuation-in-part of Ser. No. 648,250, Jan. 13, 1976, abandoned. This application Mar. 21, 1977, Ser. No. 779,734

Int. Cl.[2] A41D *13/10*

U.S. Cl. 2—20 **3 Claims**

1. A protective glove for wear in skateboard activities and the like wherein the risk of falling on hard surfaces is great, comprising:

a front body portion for covering the palms and sides of the hand:

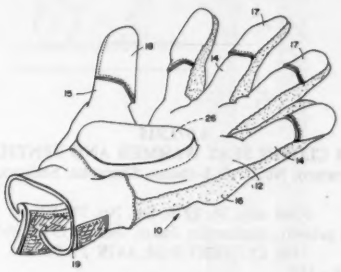
said front body portion being of a wear and tear resistant material and terminating in a lower edge thereof to be disposed below the heel of the palm of the hand;

a thick, impact-absorbing resilient pad secured inside said front body portion to cover a substantial part of the palm including said heel thereof;

a liner of flexible material fully covering said pad and surrounding portion of the inner surface of said body portion and being secured around its outer portions to said inner surface;

a back body portion for covering the back hand of a soft pliant material;

a wide heavy elastic wristband secured along said lower edge to encircle and fully cover the wrist joint; and



means for securing the ends of said wristband together in overlapping relationship to hold said glove front body portion pulled tightly toward the back of the wrist with the pad pressed against the palm so that impact forces are distributed through said pad and body portions to said wristband.

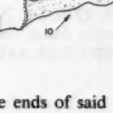
4,071,914
MASTECTOMY PAD

Abe Silverman, Chicago, Ill., assignor to Silveco Products, Inc., Chicago, Ill.

Filed Jan. 26, 1977, Ser. No. 762,940

Int. Cl.[2] A61F *1/00;* **A41C** *3/10*

U.S. Cl. 3—36 **10 Claims**



1. A mastectomy pad comprising

a. a seamless molded outer casing molded of high-loft bonded polyester non-woven fibrous material and having

1. an outer marginal edge portion;

2. an inner or body side panel;

3. a front or outer panel including

a. a generally conical-shaped body portion;

b. the said seamless molded outer casing being adapted to fit into and to be worn in and to fill out the breast cup of a brassiere or garment by a woman who has had a mastectomy operation, and having therein

1. a hollow generally conical-shaped internal cavity and including

4. a tongue portion projecting laterally from the said body portion and which in use is adapted to extend outwardly over the underarm area of the user from which tissue has been removed as an incident to a mastectomy operation;

b. a closed and generally conical-shaped foam rubber internal casing arranged in and enclosed within the said internal cavity in the said seamless molded fibrous material outer casing and including

1. an outer marginal edge portion; and having therein

2. a generally conical-shaped internal cavity;

c. weight means in the form of a body of filler material

arranged in the said generally conical-shaped internal cavity in the said closed foam rubber internal casing; and

d. a protective fabric outer cover arranged over and outwardly of and enclosing the said seamless molded outer casing of fibrous material and having

1. an outer marginal edge portion;

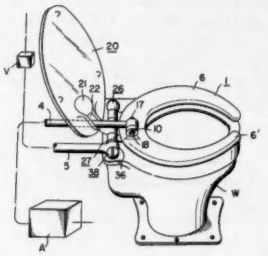
e. the said seamless molded outer casing of high-loft bonded polyester non-woven fibrous material and the said protective outer fabric cover being stitched together along their said outer marginal edge portions outwardly of the said outer marginal edge portion of the said closed and generally conical-shaped foam rubber internal casing.

4,071,915

WATER CLOSET SEAT WARMER AND VENTILATOR

Kuze Kurataro, No. 37-5, 1-chome, Sasazuka, Shibuya, Tokyo, Japan

Filed Aug. 16, 1976, Ser. No. 714,836
Claims priority, application Japan, Jan. 9, 1975, 50-105010
Int. Cl.[2] E03O *9/04;* A47K *13/00*
U.S. Cl. 4—217 **1 Claim**



1. A water closet comprising a closet chamber and a closet seat having wings, said wings having front tip portions and rear portions, said rear portions joined together forming an integral closet seat, said water closet further including right and left mounting means for attaching the rear portion of said wings to said closet chamber, said water closet also including a cover for said closet seat, said mounting means pivotally mounting said cover thereupon, said improvement comprising:

a warm air source;

a vacuum source;

suction passageway means for connecting a plurality of suction ports along said wings, between said tip and said rear portions, with said mounting means;

suction connecting means for connecting, through said mounting means, said suction passageway means with said vacuum source;

closet seat warming means comprising at least one passageway in each wing, from the rear portion of the wing to the front tip thereof, said passageway connected to said suction passageway means at said tip; and

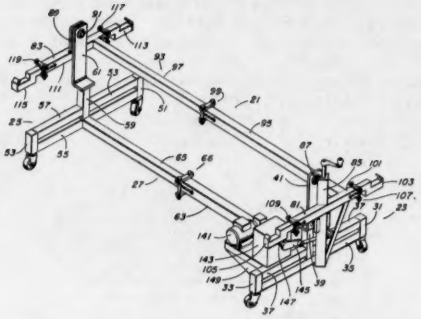
warm connection means for connecting said seat warming means with said warm air source, said warm connection means comprising a pivotal connection between said warm air source and said seat warming means permitting the flow of warm air therethrough regardless of the position of said seat allowing said seat to be quickly warmed while at the same time conducting odors and foul air associated therewith from said water closet chamber through said suction ports and into said vacuum source.

4,071,916

APPARATUS FOR ROCKING A BED

Yvette E. Nelson, Rte. 4, Box 78, Burleson, Tex. 76028

Filed Mar. 17, 1977, Ser. No. 778,687
Int. Cl.[2] A61G *7/00;* A47D *9/02*
U.S. Cl. 5—62 **7 Claims**



1. An apparatus for supporting and rocking a bed or the like, comprising:

base means,

support means having structure for supporting a bed,

said support means being pivotally coupled to said base means for rocking motion about a first axis,

crank means,

drive means coupled to said crank means for rotating said crank means,

guide means pivotally coupled to said base means for rocking motion about a second axis spaced from said first axis,

arm means having a first end pivotally coupled to said crank means,

said arm means having a second end pivotally coupled to said guide means for rocking said guide means about said second axis as said crank means is rotated by said drive means,

coupling means having a first portion coupled to said guide means and a second portion coupled to said support means for rocking said support means about said first axis as said guide means is rocked about said second axis, and

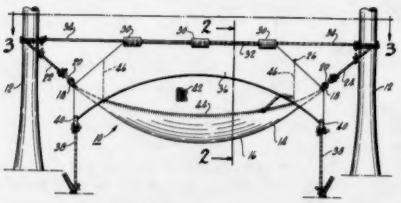
adjusting means for adjusting the position of said coupling means relative to said support means and to said guide means to adjust the angle through which said support means may be rocked about said first axis.

4,071,917

HAMMOCK HAVING CANOPY

Hector Mojica, 831 W. Lincoln Ave., Milwaukee, Wis. 53215

Filed Apr. 12, 1976, Ser. No. 676,110
Int. Cl.[2] A47K *11/02;* E04F *10/00*
U.S. Cl. 5—121 **9 Claims**



1. A hammock comprising:

a rectangular sheet of fabric suitable for supporting a person in the reclining position, said sheet having a first dimension extending between ends of said sheet and a second

dimension transverse to, and shorter than, said first dimension, said second dimension extending between sides of said sheet, said supporting sheet being gathered at each of said ends and joinable to ropes for suspending the sheet between spaced anchors;

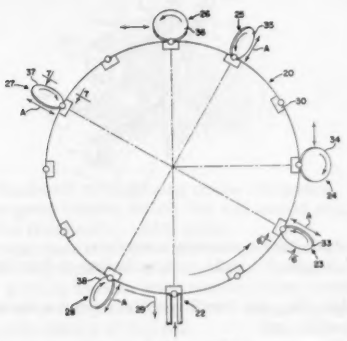
a canopy over said supporting sheet, said canopy comprising a second sheet of waterproof fabric material, said second sheet having a first dimension extending between ends of said sheet and approximating that of said supporting sheet and a second, transverse dimension exceeding the second dimension of said supporting sheet, said second dimension extending between sides of said second sheet, said second sheet having portions of its ends fastened to said ends of said supporting sheet and similarly gathered, one entire side of said second sheet being attached to one entire side of said supporting sheet, said second sheet having a medial portion supportable above the center of said supporting sheet, and the free side of said second sheet formable, with the portions of said ends of said second sheet not fastened to said ends of said supporting sheet, into an extendable fly; and

netting joined to said medial portion of said second sheet and selectively joinable to the unattached side of said supporting sheet for permitting access to the hammock.

4,071,918
METHOD OF PRODUCING DRILL SCREWS

Martin Alfred Baer, Niles, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Nov. 8, 1976, Ser. No. 739,897
Int. Cl.[2] B23G *9/00*
U.S. Cl. 10—10 R **6 Claims**

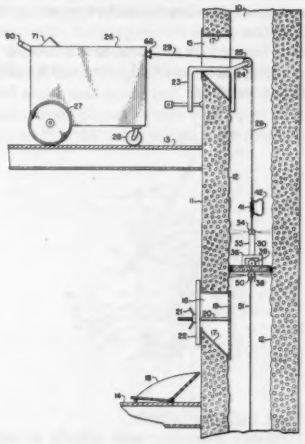


1. In a method of producing screws of the self-drilling variety which includes a pair of oppositely disposed and inclined, relatively long flutes, by intermittently conveying successive screw blanks from a loading station along a single generally circular path for predetermined positioning at successive work stations where rotary cutting operations are performed on selected regions of exposed shank tip portions, including the steps of engaging rotary cutting means, at a work station adjacent the circular path, against a predetermined region of the shank adjacent the tip and forming a first slot portion in the shank, engaging rotary cutting means at another work station adjacent the circular path, against a second predetermined region spaced axially from said first predetermined region and forming a second slot portion in the shank merging with the first slot portion and thereby configuring a single substantially continuous flute in one side of the shank tip of the screw blank.

4,071,919
WASTE CHUTE CLEANING APPARATUS

Cary Lynn Fields, New York, N.Y. 10021; John Anthony Fernandez, 21 Joludow Drive, Massapequa, N.Y. 11762, and Salvatore Cortese, 7809-97th Ave., Queens, N.Y. 11416

Filed Feb. 22, 1977, Ser. No. 770,325
Int. Cl.[2] A46B *13/04*
U.S. Cl. 15—21 R **9 Claims**



1. An apparatus for cleaning waste chutes comprising, in combination, at least a first tank for a cleaning solution, a second tank for an insecticide, a hose containing first and second fluid paths and electric wires, means introducing cleaning solution from said first tank into said first fluid path of said hose, means introducing insecticide from said second tank into said second fluid path of said hose, a current source connected to said wires of said hose, a cleaning head attached to said hose, said cleaning head having an upper spray head connected to said second fluid path of said hose, peripheral brushes below said upper spray head, a vibrator fixed to said spray head and connected to said wires of said hose, and a lower spray head below said brushes connected to said first fluid path of said hose, and means lowering said cleaning head down a waste chute, said lower spray head spraying the waste chute with a cleaning solution as said cleaning head is lowered, said brushes being oscillated by said vibrator cleaning the sprayed chute, and said upper spray head spraying the cleaned chute with insecticide.

4,071,920
SWEEPER

Thomas S. Block, Muskegon, Mich., assignor to Clarke-Gravely Corporation, Muskegon, Mich.

Filed Feb. 4, 1976, Ser. No. 655,060
Int. Cl.[2] A47L *11/22*; E01H *1/04*
U.S. Cl. 15—49 C **17 Claims**

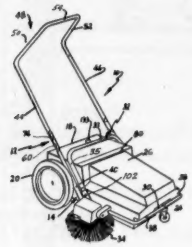
1. A sweeper comprising:

a brush housing;

a generally continuous, tubular member constituting a combined tubular frame and handle, said tubular member including a generally U-shaped integral tubular forward portion having a forwardly located base and rearwardly extending leg portions, said leg portions extending generally horizontally for a portion of their lengths and then being angled upwardly and rearwardly and being joined to said brush housing at said upward and rearward angled portion; said integral tubular forward portion terminating at the ends of said upwardly and rearwardly extending leg portions, at a point generally adjacent said brush housing and joining and blending into an upwardly and rearwardly

extending tubular handle portion, said handle being articulated at said terminating point of said integral tubular forward portion, generally adjacent said brush housing, said handle portion having a lower portion and an upper operator gripping and control portion and further including releasable detent means at said point of articulation whereby said handle can be maintained in a rearwardly extending operable position, but can be released and folded over the top of said brush housing and said dust bin into a stored position, whereby said sweeper can be tipped up and stored on end;

a brush housing secured on each end to said tubular member generally at said juncture of said frame and handle portion of said tubular member;



a pair of ground engaging wheels;

means for rotatably mounting said wheels to said brush housing;

a brush rotatably supported within said brush housing;

forward support means secured to said frame portion of said tubular member for supporting the forward end of said frame portion; and

a dust bin removably supported by resting only on said frame portion of said tubular member and on said brush housing and having an opening at one end and being positioned with said opening adjacent said brush and said brush housing so as to receive debris swept up by said brush.

4,071,921

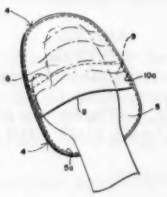
DISPOSABLE GREASE ABSORBING MITT

Daniel E. Jury, Ulysses, Kans., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Feb. 9, 1977, Ser. No. 766,868

Int. Cl.[2] A41D *19/01;* A47L *13/18*

U.S. Cl. 15—227 **2 Claims**



1. A disposable grease absorbing device, comprising

a pad of grease absorbent material having a pair of spaced opposite surfaces and a bordering edge therearound;

a sheet of liquid-impervious material affixed to the grease absorbent material and covering one of the surfaces thereof;

a sheet of wrapping material larger than approximately half the area of a surface of the pad affixed to approximately half the bordering edge and next-adjacent the liquid-impervious material to form a main pocket leaving an unattached rear portion, said unattached portion being folded over on itself to form a flap having a free line and a strip extending across the liquid-impervious material along the free line of the wrapping material between said liquid-impervious material and the attached portion, said flap being affixed at its ends to the liquid-impervious material along the bordering edge of said liquid-impervious material thereby forming an inner pocket opening into the main pocket formed by the wrapping material and the liquid-impervious material, whereby when placed in grease the grease absorbent material of the device absorbs the grease and the device is then disposable with complete constraint of the grease by folding the pad in half over on itself with half the grease absorbent material abutting the other half thereof, then twisting the main pocket so that it covers the half of the liquid-impervious material previously uncovered thereby and the inner pocket is on the outside and spaced from the liquid-impervious material by said wrapping material at the foldover line of the liquid-impervious material, and then twisting the inner pocket so that it covers a strip of liquid-impervious material along said foldover line and restrains the device in folded condition.

4,071,922

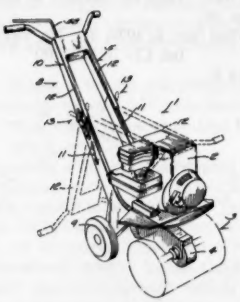
FOLDABLE HANDLE

John W. Davies, III, Plymouth; Edward W. Enters, Fredonia, and Eugene A. DuPas, Plymouth, all of Wis., assignors to Gilson Brothers Company, Plymouth, Wis.

Division of Ser. No. 660,127, Feb. 23, 1976, Pat. No. 4,011,913. This application Mar. 11, 1977, Ser. No. 776,516

Int. Cl.[2] A01B *33/02, 33/08;* B62D *51/04*

U.S. Cl. 16—112 **8 Claims**



1. A foldable handle assembly comprising

a fixed elongated handle portion having a first free end portion;

a movable elongated handle portion having a second free end portion; and

connecting means joining said fixed and movable handle portions and operative to selectively clamp said fixed and movable handle portions against relative pivotal movement in a normal position where the longitudinal axis of said fixed and movable handle portions are aligned and further operative to release said movable handle portion for limited longitudinal movement relative to said fixed handle portion sufficient to release said movable handle portion for pivotal movement relative to said fixed handle portion from the normal position to a folded position, said connecting means including

a blade extension formed as part of one of said first and second free end portions,

an elongated slot in said one of said first and second free end portions and extending parallel to the longitudinal axis of the respective of said fixed and movable handle portions,

a strap on the other of said first and second free end por-

tions and spaced outwardly therefrom for slidably receiving said blade extension thereunder when said movable handle portion is in the normal position,

a lock opening in said other of said first and second free end portions, said slot and said lock opening being aligned when said blade extension is positioned under said strap, and

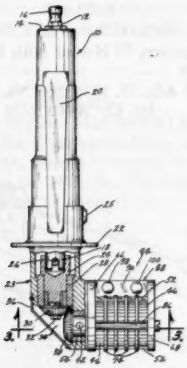
fastening means extending through said lock opening and said slot and selectively operative to clamp said fixed and movable handle portions in the normal position against longitudinal movement and to free said movable handle portion for sufficient longitudinal movement relative to said fixed handle portion to withdraw said blade extension from said strap while maintaining a connection between said fixed and movable handle portions to afford pivotal movement of said movable handle portion relative to said fixed handle portion from the normal position to a folded position.

4,071,923

HAND-HELD MEAT SKINNING DEVICE

David W. Smith, Des Moines, Iowa, assignor to Townsend Engineering Company, Des Moines, Iowa

Filed Aug. 4, 1976, Ser. No. 711,584
Int. Cl.[2] A22B 5/16
U.S. Cl. 17—21 **9 Claims**



1. A hand-held meat skinning device comprising,

an elongated housing having first and second ends,

a motor positioned in said housing,

a skinning blade mounted at said second end of said housing,

a rotatable gripping roll positioned above said skinning blade for gripping the skin being removed from the meat,

means connecting said motor and said gripping roll for causing rotation of said roll,

actuation means on said housing connected to said motor to permit the operator to actuate said motor,

said actuation means comprising a lever pivotally connected to said housing,

and a guard ring extending outwardly from said housing adjacent said second end to prevent actuation of said lever when the device is laid upon a supporting surface.

4,071,924

APPARATUS FOR REMOVING A FOWL FROM A CONVEYOR

Pieter Meyn, Noordeinde 72, Oostzaan, Netherlands

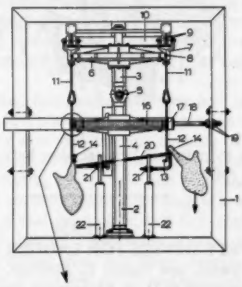
Filed Feb. 9, 1976, Ser. No. 656,827
Int. Cl.[2] A22B 5/00
U.S. Cl. 17—24 **4 Claims**

1. An apparatus for removing a fowl from an overhead conveyor traveling along a path which is part of a circle, said conveyor including at least one generally U-shaped conveyor hanger having legs with hooks at its lower end for gripping the fowl's ankle joints, said apparatus comprising a stationary frame;

a stationary guide rail attached to said frame and positioned relative to the path of said conveyor in such a manner that the legs of the fowl carried by said conveyor hanger abut against said guide rail;

clamping means operationally connected with said frame for gripping the legs of said conveyor hanger, and means for moving said clamping means along said path in synchronism with said conveyor;

said guide rail being shaped in such manner that, while being moved along said guide rail, the fowl is tilted away from said conveyor hanger which is gripped by said clamping means, so that the ankle joints of the fowl are lifted out of



said hooks one after the other, said clamping means comprising a horizontal clamping wheel mounted in said frame for rotation about a vertical axis and provided with a toothed outer periphery, and a stationary clamping rail attached to said frame and cooperating with said toothed outer edge for locking the legs of the conveyor hanger therebetween, said clamping rail being concentric with the clamping wheel and extending along a portion of the circumference of said clamping wheel so that the legs of said conveyor hanger can enter between the circumference of said clamping wheel and said clamping rail and be gripped between the teeth at the outer periphery of said clamping wheel and said clamping rail to be held against vertical and radial movement relative to said stationary guide rail.

4,071,925

APPARATUS FOR FORMING TEXTILE LAP

Craig L. Folk, New Orleans, La., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed May 25, 1976, Ser. No. 689,772
Int. Cl.[2] D04H 1/00
U.S. Cl. 19—296 **7 Claims**

1. Apparatus for pressing textile fibers and tufts into lap comprising:

a. means to lodge textile fibers and tufts between two flexible belts;

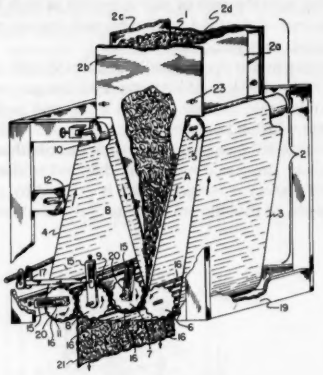
b. means to thereafter pass said belts between first and second fluted rollers, then partially around said second roller, then between said second roller and a third flutted roller, then partially around said third roller, and then between said third roller and a fourth fluted roller,

c. a fifth roller, which is parallel to and adjacent said third roller at a location where said belts pass partially around said third roller, so that said belts pass between said third and fifth rollers,

d. a means to oscillate said fifth roller across the upper periphery of said third roller,

e. means to maintain compression between said second and first rollers,

f. and to maintain compression between said second and third rollers,



g. means to maintain compression between said third and fourth rollers.

4,071,926

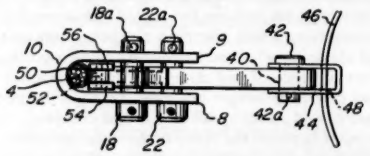
SAFETY DEVICE FOR LADDER CLIMBERS

Robert P. Sweet, and Daniel L. Stember, both of Red Wing, Minn., assignors to D. B. Enterprises, Inc., Red Wing, Minn

Continuation-in-part of Ser. No. 468,568, May 9, 1974, Pat. No. 3,979,797. This application Apr. 26, 1976, Ser. No. 680,281

Int. Cl.[2] F16G *11/00*

U.S. Cl. 24—136 R **11 Claims**



1. An improved safety device adapted to be secured to a person working at an elevated level and having means to releasably engage an elongated, vertically extending safety carrier such as a cable or rod, if the person falls, comprising:

a clamping bracket having an elongated clamping surface on one side thereof constructed and arranged to bear against one side of an elongated safety carrier on which said bracket is adapted to be slidably mounted in an upright position with said clamping surface extending generally parallel to the safety carrier;

a wedge plate shiftably supported on said bracket and having an elongated clamping side extending substantially parallel to said clamping surface of said bracket in spaced apart relation thereto for the extension of an elongated safety carrier therebetween, the lower end of said wedge plate being freely mounted with respect to said upper end;

a cam follower surface on the upper end of said wedge plate disposed in coacting engagement with a camming member secured to said clamping bracket, with said cam follower surface positioned between said camming member and said bracket clamping surface, and said cam follower surface extending generally upwardly and inwardly towards said bracket clamping surface;

an actuating arm pivotally attached to said clamping bracket for pivotal movement about a horizontal axis and projecting outwardly therefrom away from said bracket clamping surface, the outer, free end of said arm having means thereon for attachment to a workman, and the inner end of said arm being drivingly associated with said wedge plate with the point of pivotal attachment of said actuating arm to said clamping bracket being between the outer, free end of said arm and the location of driving association of the inner end of said arm with said wedge plate whereby the upward pivotal movement of said arm inner end imparts upward movement to said wedge plate, and said cam follower surface being on a portion of said wedge plate above said location of driving association of the inner end of said arm with said wedge plate; and

a camming element on the inner end portion of said actuating arm normally bearing against the lower end portion of said wedge plate at a location outwardly from said clamping side thereof, and below said location of driving association of the inner end of said arm with said wedge plate whereby a downward force generated on the outer end of said actuating arm will pivot the inner end of said arm upwardly, and the driving association of the inner end of said arm with said wedge plate will carry said wedge plate upwardly against said camming member to urge said wedge plate inwardly against a safety carrier, with said camming element serving to simultaneously urge the lower end of said wedge plate inwardly against the safety carrier as the inner end of said arm pivots upwardly.

4,071,927

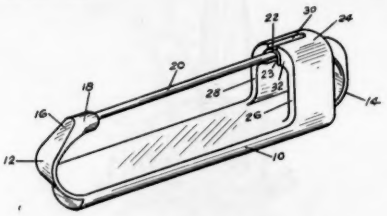
MOLDED SAFETY PIN

Dante Victor Bagnasco, 70 Harbor Hills Drive, Port Washington, N.Y. 11050

Filed Aug. 27, 1976, Ser. No. 718,359

Int. Cl.[2] A44B *9/10*

U.S. Cl. 24—156 **5 Claims**



1. A safety pin of the character described comprising an elongated strip-like molded base member composed of resilient plastic material having sufficient thickness to provide a comparatively rigid base, said base member at one end merging into a comparatively thin web-like flexible extension tapered in width toward the outer end thereof, a pin extending longitudinally from the tapered end of said extension so that it can be readily biased back over the base member, and a detent extending in a reverse loop from the opposite end of said base member for retaining said pin in closed position when it is moved beneath the detent, said base member also including as a molded part thereof wing-like pin guiding structure extending transversely from the base at opposite sides of the detent to partly enclose and overlie said detent.

4,071,928

SLIDER FOR A CONCEALED SLIDE FASTENER

Kiyoshi Oda, Kurobe, Japan, assignor to Yoshida Kogyo K.K., Japan

Filed Oct. 22, 1976, Ser. No. 735,053

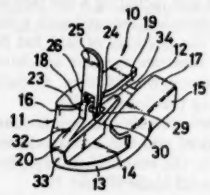
Claims priority, application Japan, Oct. 31, 1975, 50-149841[U]

Int. Cl.[2] A44B *19/26*

U.S. Cl. 24—205.1 R **6 Claims**

1. A slider for a concealed slide fastener comprising: a body including a flared front end and a contracted rear end, and having a bottom wall, a pair of side flanges formed on said

bottom wall, and a pair of inturned lips extending from said side flanges; an element guide island formed centrally on said bottom wall near the flared front end and cooperating with said side flanges in providing a substantially Y-shaped guide channel for the passage therethrough of a pair of rows of interlocking fastener elements, said island extending in the longitudinal direction of the slide fastener: a support lug provided on said island at one end thereof remote from the flared front end; a one-piece pull tab pivotally supported on said lug



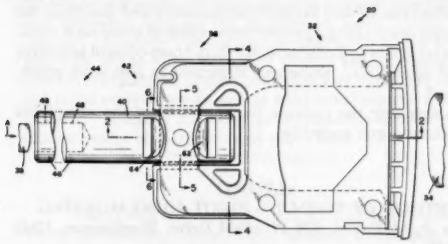
and having means held in engagement with the sides of said support lug and a pull tab rest provided on said island and having a top surface extending longitudinally from said support lug toward the flared front end of said slider body, said top surface being sloped downwardly toward the front end of said island, said pull tab having a flat surface engageable flatwise with the top surface of said pull tab rest when said pull tab is pivoted about said lug downwardly toward the flared front end.

4,071,929

MOUNTING FOR BUCKLE

Yogendra Singh Loomba, Washington, Mich., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Oct. 14, 1975, Ser. No. 621,971
Int. Cl.[2] A44B *11/26*
U.S. Cl. 24—230 A **8 Claims**



1. In an apparatus comprising a buckle and a stiff member for anchoring the buckle to a structure, wherein the buckle includes a housing within the buckle, the housing comprising a plurality of laminate plates secured together, including a first plate, a second plate and a third plate; the second plate arranged between the first plate and the third plate; said laminate plates each having an interior opening adjacent a mounting end of said plates; said buckle, housing, first plate, second plate and third plate each having a tongue end at which a tongue is inserted into the buckle and housing a mounting end, an improvement for connecting the buckle to the stiff member comprising:

a ferrule having an elongated shape, a buckle end and a mounting end; means at said buckle end of said ferrule for attaching said buckle end of said ferrule to said buckle; and means at said mounting end of said ferrule for attaching said mounting end of said ferrule to said stiff member;

said means at said mounting end of said ferrule for attaching said mounting end of said ferrule to said stiff member comprising a swagable material at the mounting end of said ferrule, said mounting end of said ferrule having a bore therein for receiving said stiff member, said bore having a cross-sectional configuration which conforms to a cross-sectional configuration of a portion of said stiff member to be positioned in said bore, said bore extending along a central longitudinal axis of said ferrule from said mounting end of said ferrule to a point along the longitudinal axis of said ferrule between said buckle end and said tongue end;

said means at said buckle end of said ferrule comprises: a first flange, a second flange, a first planar surface and a second planar surface; and said first planar surface and said second planar surface are disposed between said first flange and said second flange; said second plate having a slot extending along a longitudinal axis of said second plate from the mounting end to the interior opening of said second plate, said first flange of said ferrule disposed within said interior opening of said plates, said second flange of said ferrule disposed at said mounting end of said plates, said planar surfaces of said ferrule disposed within said slot of said second plate, and said planar surfaces of said ferrule disposed between said first plate and said third plate;

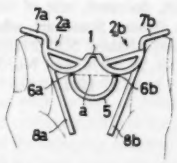
a first portion of said first flange extending into said interior opening of said first plate and a second portion of said first flange extending into said interior opening of said third plate; a first portion of said second flange extending adjacent to said mounting end of said first plate and a second portion of said second flange extending adjacent to said mounting end of said third plate; said first plate and said third plate each having a mounting portion located between their mounting ends and their interior openings; said first portion of said first flange and said first portion of said second flange are each bent toward each other, engaging said mounting portion of said first plate; and said second portion of said first flange and said second portion of said second flange each bent toward each other, engaging said mounting portion of said third plate.

4,071,930

PINCHING CLIP

Toshie Tanaka, Machida, Japan, assignor to Nifco Inc. and Nichiei Bussan Co., Ltd., both of Tokyo, Japan

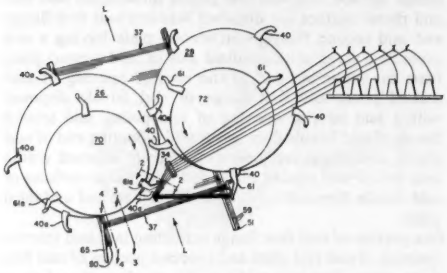
Filed July 27, 1976, Ser. No. 709,061
Int. Cl.[2] A44B *27/00*
U.S. Cl. 24—252 R **5 Claims**



1. A one-piece plastic pinching clip including a pair of arcuate arms each having a predetermined width and interconnected along adjacent first ends through a hinge portion with the concave sides of said arms facing toward each other, an elastic overcenter spring brace disposed astraddle said hinge portion and integrally connected at each extremity thereof with one of the rear convex sides of said arms, pinching means disposed within said concave sides of said arms, an elongated damping piece extending substantially tangentially from the convex side of each arm along a line positioned intermediate the ends of said arms, operating means extending outwardly from the free end of each arm opposite the adjacent hinged ends whereby an operator can embrace the clip and grasp the operating means between his thumb and forefinger and apply pressure thereto to close said arms against the action of said

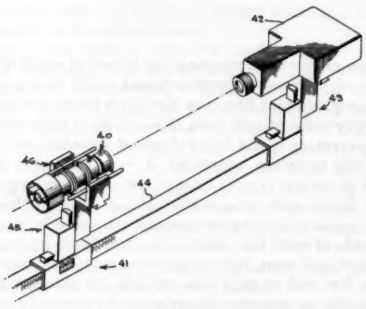
spring brace with the damping pieces riding on the interior of the operator's finger and thumb.

4,071,931
WEB FORMING METHOD
Donald Olcott Niederhauser, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.
Filed Mar. 31, 1977, Ser. No. 783,455
Int. Cl.[2] D04H 3/04, 3/05
U.S. Cl. 28—101 **7 Claims**



1. In a method for traversing a strand between two spaced rows of strand-restraining elements moving together in the same direction in the same plane to form a web, each traverse including the steps of feeding the strand from a supply to a location out of the plane of the rows of strand-restraining elements and between them, and thence toward one of the rows, engaging the strand between said location and said strand-restraining elements and moving the strand toward the other row of strand-restraining elements in a transverse plane angled to the plane of the strand-restraining elements while simultaneously moving the strand away from said transverse plane to form a loop in the strand defined by sides and an end, and bringing said loop into a plane substantially parallel to the plane of the strand-restraining elements, the improvement comprising: bringing the end of the loop substantially parallel to said other row and depositing said loop on said other row of strand-restraining elements as soon as the end of the loop moves beyond said other row.

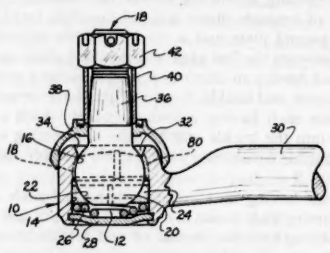
4,071,932
METHOD OF MAKING ELECTRON GUNS FOR CATHODE RAY TUBES AND THE LIKE
Adrian W. Standaart, deceased, late of Winston-Salem, N.C., and by Josephine Benson Standaart, administratrix, 5 Bonbrook Circle, Winston-Salem, N.C. 27106
Filed Oct. 28, 1976, Ser. No. 736,717
Int. Cl.[2] H01J 9/02
U.S. Cl. 29—25.14 **20 Claims**



1. The method of processing elements of an electron gun assembly for cathode ray tubes and the like to provide precision-shaped, sized, and aligned beam-control apertures in elements thereof, the electron gun assembly in completed form including a cathode, control grid, first anode, focus anode, and accelerating anode elements rigidly assembled in predetermined alignment along a longitudinal reference axis paralleling the axis of one or more electron beams to be generated, shaped, controlled, focused and accelerated thereby and the control grid and first anode elements each comprising a substrate having a substrate aperture therethrough for each electron beam to be formed and including a flat face substantially perpendicular to the beam axis covered with a thin layer of metal overlying at least the portions of said flat face immediately adjacent each said substrate aperture and having a beam-controlling aperture through said layer at each said substrate aperture, comprising the steps of:

a. preforming the substrate aperture in substrates shaped to form said control grid and first anode as oversized apertures relative to the beam-control apertures to be formed in their associated metal layers,
b. forming the metal layers on said substrates as flat metal layers of uniform thickness extending over predetermined areas of a flat face portion of each substrate and uninterruptedly spanning the preformed substrate apertures without any beam-control apertures therein,
c. assembling such substrates of step (b) for a control grid and first anode on a supporting frame member of the electron gun assembly together with focus anode and accelerating anode elements and without any cathode element assembled therewith to form a skeleton subassembly,
d. mounting the electron gun skeleton subassembly of step (c) on a laser bench assembly having a laser beam source and means for adjusting the position of the electron gun skeleton subassembly with respect to the laser beam two-dimensionally in a plane perpendicular to the laser beam axis and lengthwise along the bench assembly,
e. focusing the laser beam in the metal layer zones spanning the substrate apertures of the control grid and first anode substrates of said skeleton subassembly and directing the laser beam along a predetermined axis to strike such metal layer zones and concurrently form beam-control apertures of desired size, shape and alignment in said layer zones, and
f. assembling the cathode thereon to form the completed electron gun assembly.

4,071,933
METHOD OF FORMING PIVOT JOINT HOUSING
Victor R. McEowen, 379 Pittsfield Drive, Worthington, Ohio 43085
Filed Mar. 3, 1976, Ser. No. 663,273
Int. Cl.[2] B21D 53/10
U.S. Cl. 29—149.5 B **6 Claims**



1. The method of making housings for pivot joints comprising in combination, forging an electrically conductive workpiece of carbon steel to form a cup-shaped housing portion

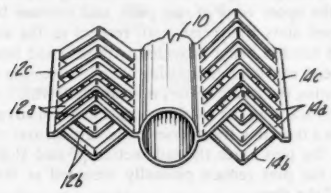
including a cavity provided with an inner wall having a bearing wall portion that includes a surface layer of decarbonized metal resulting from said forging; machining said bearing wall portion to remove said layer of decarbonized metal and form a finished bearing surface having a carbon content compatible to induction hardening; mounting said workpiece in a locating fixture means including an inductor electrode disposed in said cavity in close proximity to said bearing surface; and energizing said electrode to heat in a controlled manner to concentrate the heating effect of said electrode on said bearing surface and thereby harden an annular zone at said bearing surface, the metal in the balance of the housing surrounding said zone remaining none hardened, tough and fatigue resistant.

4,071,934

CFT BOX FIN

Junior O. Zolman, and Carl O. Griewahn, both of Adrian, Mich., assignors to Brazeway, Inc., Adrian, Mich.

Filed Oct. 17, 1975, Ser. No. 623,241
Int. Cl.[2] B23P *15/26*
U.S. Cl. 29—157.3 A **7 Claims**



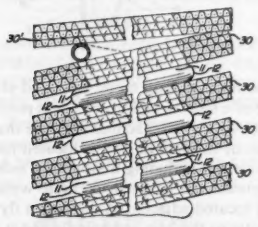
1. A method of manufacturing an integral extruded fin/tube combination wherein the tube forms a fluid conduit and the fin effects a thermal exchange between fluid in the tube and the surrounding environment comprising the steps of: extruding a relatively thin-walled tubular body having at least one radially extending and relatively thin-walled fin integral with the body, and thereafter splitting the fin over its entire length into a plurality of narrow and radially parallel strips which are integral only at the radial extremity thereof and alternately bent into reversely similar peaked configurations exhibiting substantial radial compliance as well as axial bunching and spreading capability whereby the tube/fin combination is both radially dimensionally conformable and easily bent.

4,071,935

METHOD OF MAKING HEAT EXCHANGES

Victor D. Molitor, Denver, Colo., assignor to Stainless Equipment Company, Englewood, Colo.

Continuation-in-part of Ser. No. 602,685, Aug. 7, 1975, abandoned, and a continuation-in-part of Ser. No. 768,152, Feb. 14, 1977. This application Oct. 10, 1975, Ser. No. 621,284
Int. Cl.[2] B23P *15/26*
U.S. Cl. 29—157.3 R **11 Claims**



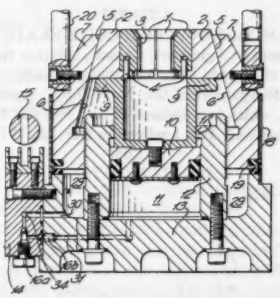
1. A method of making a heat exchanger, comprising:
inserting layers of deformable mesh having strands between adjacent turns and across the space encompassed by the turns of spaced, connected and generally parallel hollow coils through which a heat exchange liquid is to be passed;
exerting a compression force on said mesh layers toward said coils until the distance between adjacent coils diminishes, and said mesh layers are compressed between said coils and against each other and are deformed into contact with said coils; and
restraining said mesh to maintain the deformed and compressed condition thereof and the compression contact of the deformed strands with the coils to permit conduction of heat along the strands between the coils and the space encompassed by the turns through which a gas is to be passed in a direction transverse to the planes of the respective coils.

4,071,936

CRIMPING APPARATUS

John Lionel Smith, Bedford, England, assignor to Imperial-Eastman (UK) Limited, St. Neots, United Kingdom

Filed Apr. 12, 1976, Ser. No. 675,793
Claims priority, application United Kingdom, Apr. 16, 1975, 15626/75
Int. Cl.[2] B23P *19/04*
U.S. Cl. 29—237 **4 Claims**

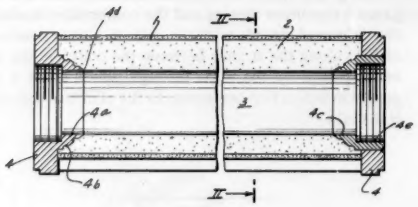


1. An apparatus for crimping a coupling to a hose end which comprises a crimping ring having its inner wall formed as a tapered camming surface, a plurality of circumferentially-disposed crimping dies each having an outer die member having an opposed tapered camming surface for cooperation with the camming surface of the crimping ring and an inner die member releasibly mounted on said outer die member and having a crimping surface for crimping a coupling to a hose end, hydraulic piston and cylinder means for moving the crimping ring or the crimping dies axially relative to one another from a start position to an end position so that cooperation between the camming surfaces causes a transverse movement of the crimping dies inwardly of the crimping ring and parallel to the plane thereof to provide a crimping action, said cylinder having a stop against which said piston will bear during the operation of the apparatus whereby the movable one of the crimping ring and the dies are moved through the same axial distance each time of operation irrespective of the extent of crimp desired, and means for adjusting the relative axial position between the crimping ring and the dies at said start position so as to provide adjustment for the extent of the crimp by a corresponding adjustment of the relative axial position between the crimping ring and dies at said end position.

4,071,937
FILTER CARTRIDGE WITH FOLDED FILTER SHEATH

Rainer Röhlig, Radevormwald, Germany, assignor to Sintermetallwerk Krebsoge GmbH, Radevormwald, Germany

Filed Aug. 10, 1976, Ser. No. 713,226
Claims priority, application Germany, Aug. 14, 1975, 2536276
Int. Cl.[2] B22F 3/24
U.S. Cl. 29—420 1 Claim



1. A method of making a filter cartridge comprising the steps of:

isostatically pressing sinterable material against a smooth core to form a tubular support body having a plurality of support ribs extending therealong;

isostatically pressing a sinterable filter sheath substantially of constant wall thickness against said support body;

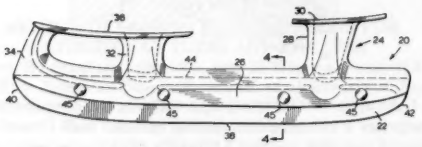
pressing a headpiece onto said support body; and

sintering said sheath, said support body and said headpiece simultaneously to bond them together.

4,071,938
METHOD OF MAKING COMPOSITE SKATE ASSEMBLY

Alan F. Chambers, Agincourt, Canada, assignor to Nylite Skate Company of Canada Ltd., Markham, Canada

Continuation-in-part of Ser. No. 677,577, April 16, 1976, abandoned, which is a division of Ser. No. 608,499, Aug. 28, 1975, abandoned. This application Dec. 20, 1976, Ser. No. 752,055
Int. Cl.[2] B23P 17/00
U.S. Cl. 29—423 13 Claims



1. A method of forming an ice skate assembly of the type including an elongated steel blade having an upper portion, a lower portion including a skating edge, and ends, and a blade-supporting body of a synthetic plastic material and comprising the steps:

forming a plurality of transverse holes in longitudinal alignment along the length of said blade;

heat treating to harden said blade;

temporarily plugging the transverse holes in said blade;

moulding a blade-supporting body of synthetic plastic material about said upper portion of the blade including said holes such that at least one of said ends of the blade is not covered by the blade-supporting body;

allowing said body and blade to cool after moulding whereby said plastic body may shrink relative to said blade;

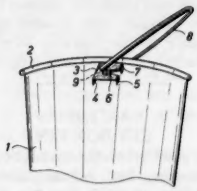
unplugging the blade holes so as to provide transverse passages through said body and said blade; and

inserting means in said transverse passages to mechanically interlock said blade and said body.

4,071,939
METHOD OF MOUNTING A HANDLE ON A PAIL

Erik Bock, Slangerup, Denmark, assignor to Superfos Emgallage A/S, Denmark

Division of Ser. No. 313,658, Dec. 11, 1972, abandoned. This application Sept. 16, 1976, Ser. No. 723,721
Int. Cl.[2] B23P 19/00
U.S. Cl. 29—434 2 Claims

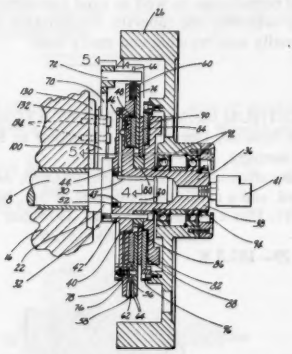


1. The method of mounting the handle into a plurality of pails, said pails comprising means for mounting the handles, said means comprising recesses diametrically opposite to each other at the upper edge of said pails, said recesses being key-hole shaped slots transverse with respect to the axis of the pails, said handles being provided with pins and heads at the ends thereof, said slots comprising a circular section for pivotally mounting the heads of the pins and a tail, which comprises the steps of stacking the pails telescopically, and advancing the handles in a direction transverse to the vertical axis of the pails whereby the pins enter the tail section of said slots and the heads of the pins remain pivotally mounted in the circular section of the slots.

4,071,940
CLUTCH-BRAKE UNIT FOR A PRESS AND METHOD AND JIG FOR INSTALLING THE SAME

Burton W. Hazelton, Kirkwood, Mo., assignor to Hazelton Products, Inc., Valley Park, Mo.

Filed Oct. 29, 1976, Ser. No. 736,898
Int. Cl.[2] P23Q 3/00
U.S. Cl. 29—468 19 Claims



1. A method for installing an air-operated clutchbrake unit on the spindle of a shaft which rotates in a press frame having a boss provided with a flat machined surface that is perpendicular to the axis of the spindle and is located near the spindle, the clutch-brake unit including a mounting hub configured to fit over the spindle and adapted to rotate with the spindle, a brake element located adjacent to the hub, a flywheel adapted to rotate relative to the hub and spindle about an axis coincident to the hub axis, means for coupling the flywheel with the hub, means for urging the brake element against the hub, and a brake anchor having a base and a pin projected from the base

and capable of fitting into the brake element; said method comprising: placing a jig over the spindle of the shaft; attaching the brake anchor to the jig, the jig locating the brake anchor in the proper radial position and in the proper angular orientation with respect to the axis of the spindle such as to enable the pin of the brake anchor to project into the brake element; attaching the base of the brake anchor to the frame at the flat machined surface of the boss in said proper radial and angular position determined by the jig; removing the jig from the brake anchor and spindle; installing the mounting hub on the spindle of the shaft; installing the brake element over the hub and fitting it over the pin of the brake anchor; and mounting the flywheel so that it will rotate about the hub axis.

4,071,941

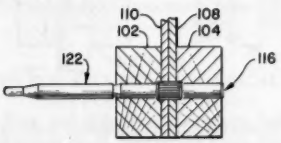
METHOD FOR ASSEMBLYING IMPROVED TRUSS JOIST

LaVern E. Sweet, 6561 Arthur St., Chino, Calif. 91710

Continuation-in-part of Ser. No. 703,040, July 6, 1976, abandoned. This application July 11, 1977, Ser. No. 814,258

Int. Cl.[2] **E04C** *3/292;* **B23Q** *3/00*

U.S. Cl. 29—468 **5 Claims**



1. The method of assemblying an improved truss joist comprising the steps of:

first, placing in general alignment apertures in the ends of at least two web elements and an aperture in at least one chord element;

directly driving through all of the aforesaid apertures a cylindrical guide pin with a tapered guiding end and having a flat end opposite its tapered guide end to already force said apertures into complete alignment, the cylindrical portion of said guide pin having approximately the same diameter as that of said apertures;

thereafter, placing a structural pin in a flat, unattached, abutting relationship with the flat untapered end of said guide pin, said structural pin having approximately the same general diameter as that of said apertures and as that of the cylindrical portion of said guide pin; and

subsequently, indirectly driving the guide pin completely out of the aforesaid apertures to that said unattached guide pin moves free of said apertures and said structural pin by directly driving through the aforesaid apertures behind the guide pin said flatly abutting structural pin for permanently securing the web elements to the chord element, the equality of the respective diameters of said apertures, said guide pin, and said structural pin serving to maintain the complete alignment of said apertures during the fastening operation without damaging said web elements or said chord element, and without deforming said apertures.

4,071,942

METHOD OF AND DEVICE FOR INTER-CONNECTING INDIVIDUAL PROFILED PLATES TO BE CONNECTED TO EACH OTHER END-TO-END, AND A STRUCTURAL CONNECTION EFFECTED THEREBY

Josef Kowallik, Freudenberg, Germany, assignor to Hoesch Werke Aktiengesellschaft, Dortmund, Germany

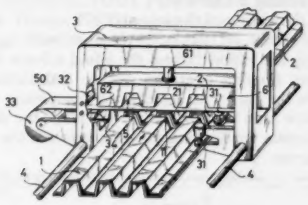
Filed Mar. 22, 1976, Ser. No. 668,933

Claims priority, application Germany, Mar. 22, 1975, P 2512759

Int. Cl.[2] **B23P** *19/00*

U.S. Cl. 29—469.5 **4 Claims**

1. A method of interconnecting individual longitudinally and identically transversely profiled plates, which includes in combination the steps of: longitudinally aligning end to end two longitudinally and identically transversely profiled plates to be interconnected so that their adjacent end faces at least nearly abut each other and their profiles are in longitudinal alignment with each other, applying a sheet metal piece profiled according to the profile of the plates to be interconnected



to and across said plates over the area where said plates at least nearly abut each other, pressing said profiled sheet metal piece entirely and vertically into the corresponding profile of the plates to be interconnected transversely, and cementing said profiled sheet metal piece to said plates to be sealingly interconnected by fusion adhesive.

4,071,943

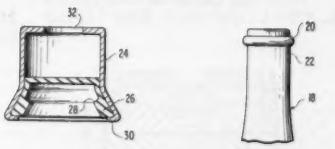
WAX CONTAINER MATERIAL

Larry E. Urbani, Van Cleave, Miss. 39564

Filed Sept. 1, 1976, Ser. No. 719,360

Int. Cl.[2] **C08L** *91/00*

U.S. Cl. 29—525 **4 Claims**



1. A process for providing an abrasion resistant, disposable container for materials comprising the steps of

providing a petroleum wax having a melting point of at least about 160° F., heating said wax above its melting point and blending therewith a resin polymer selected from the group consisting of ethylene-vinyl acetate, polyethylene, and polypropylene, said polymer being present in a concentration of no more than about 10% of said blend; molding said blend to form said container.

4,071,944

ADHESIVELY AND MAGNETICALLY HOLDING AN ARTICLE

John T. Chuss, Whitehall; Henry H. Krechel, Kunkletown, and Joseph R. Purvis, Whitehall, all of Pa., assignors to Western Electric Co., Inc., New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 624,137

Int. Cl.[2] **B01J** *17/00*

U.S. Cl. 29—574 **4 Claims**

1. A method of holding a wafer of semiconductor material having an array of semiconductor devices formed therein, which comprises the steps of:

adhering the wafer to a magnetized carrier with an adhesive,

the carrier having intersecting sets of parallel grooves and material selected from the group consisting of barrium ferrite, strontium ferrite, alnico, or a mixture of barrium and strontium ferrite;

separating the wafer into individual devices;

screening magnetic ink on the individual devices;

partially curing the ink;

electrically testing the devices;

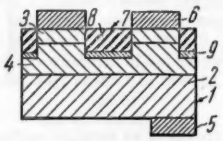
completing the curing of the ink; and

placing the carrier in trichlorethylene solvent vapor and condensing the vapor to form the liquid solvent thereon, the solvent flowing over the surface and through the grooves in the carrier to rapidly and completely remove the adhesive from beneath the devices while the magnetic forces maintain the location and orientation of the devices on the carrier.

4,071,945
METHOD FOR MANUFACTURING A SEMICONDUCTOR DISPLAY DEVICE

Anatoly Prokofievich Karatsjuba, Zeleny pereulok 3, kv. 56, Ljubertsy-1, Moskovskoi oblasti; Tatyana Georgievna Kmita, Odesskaya ulitsa, 17, kv. 63, Moscow; Igor Ivanovich Kruglov, 15 Parkovaya ulitsa, 46, korpus 1, kv. 35, Moscow; Vladimir Ivanovich Kurinny, ulitsa Vavilova, 58, korpus 2, kv. 90, Moscow; Anatoly Ivanovich Kurnosov, prospekt Mira, 190a, kv. 20, Moscow; Igor Veniaminovich Ryzhikov, 9 Parkovaya ulitsa, 49, korpus 1, kv. 67, Moscow, and Vladimir Vasilievich Judin, Schelkovskoe shosse, 87, korpus 1, kv. 195, Moscow, all of U.S.S.R.

Division of Ser. No. 461,718, April 17, 1974, Pat. No. 3,982,262.
This application July 27, 1976, Ser. No. 709,195
Int. Cl.[2] B01J *17/00*
U.S. Cl. 29—578 **11 Claims**



1. A method for manufacturing a semiconductor display device, comprising the steps of: forming in an n-type silicon-carbide crystal a diffused p-type region and a diffused region with a luminescence activator disposed between an n-type region and the newly formed p-type region; the formation being effected by way of introducing an impurity into the crystal, followed by the formation of a first ohmic contact attached to the n-type region, and at least one second ohmic contact attached to the p-type region; thereafter bombarding the p-type region with ions of an inert gas in order to produce an additional region of silicon carbide, incorporating clusters of structural radiation defects with a concentration of 10^{19} cm^{-3} to 10^{22} cm^{-3}, at an ion-flow density of $3.1 \cdot 10^{13}$ ion/cm^2·• sec to $1.25 \cdot 10^{14}$ ion/cm^2·sec, an ion energy of 10 to 400 keV, and an irradiation dose of $1.2 \cdot 10^{16}$ ion/cm^2 to $6.2 \cdot 10^{17}$ ion/cm^2.

4,071,946
PRODUCTION OF LEAD POWDER FOR TUBE ELECTRODES

Ove Nilsson, Nol, Sweden, assignor to Aktiebolaget Tudor, Sundbyberg, Sweden

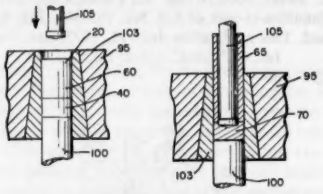
Filed Dec. 17, 1976, Ser. No. 751,886
Claims priority, application Sweden, Dec. 29, 1975, 7514664
Int. Cl.[2] H01M *4/04*
U.S. Cl. 29—623.1 **2 Claims**

1. In a process for the production of tube electrodes for use in lead storage batteries wherein a sheath is provided about a conductive rod and a dry lead powder is introduced between the sheath and the rod, the improvement which comprises making the lead powder by forming a mixture of lead powder which normally is at least 70% oxidized and from 0.1 to 3 percent by weight of polytetrafluoroethylene, heating the mixture and applying shear stresses to said powder mixture sufficient to convert a substantial portion of said polytetrofluoroethylene into fibrous form.

4,071,947
BIMETAL RESISTANCE WELDING ELECTRODE AND METHOD FOR MAKING

Russell A. Nippert, Delaware, Ohio, assignor to The Nippert Company, Delaware, Ohio

Filed Dec. 13, 1976, Ser. No. 749,983
Int. Cl.[2] B21C *23/20;* **B23K** *35/40, 35/22*
U.S. Cl. 29—624 **5 Claims**



2. A method of making a bimetal resistive welding electrode having a tip portion formed of a dispersion strengthened copper and a shank portion formed of a high conductivity copper, comprising the steps of:

forming a first cylindrical billet of dispersion strengthened copper,

forming a second cylindrical billet of high conductivity copper,

brazing together said first and second cylindrical billets at a temperature which does not anneal said dispersion strengthened copper to form a bimetal cylinder having a first cylindrical portion formed of dispersion strengthened copper and a second cylindrical portion formed of annealed high conductivity copper, and

then extruding said second cylindrical portion of said bimetal cylinder into a hardened shank portion while only partially extruding said first cylindrical portion of said bimetal cylinder thereby forming a full hard bimetal electrode.

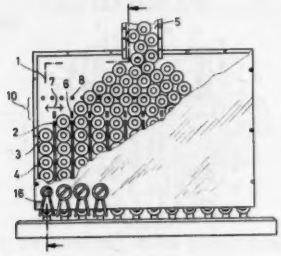
4,071,948
APPARATUS FOR DISTRIBUTING ANNULAR WORKPIECES

Klaus Deutzmann, Langenfeld, Germany, assignor to Goetzewerke Friedrich Goetze AG, Burscheid, Germany

Filed Apr. 2, 1976, Ser. No. 672,972
Claims priority, application Germany, Apr. 2, 1975, 2514297
Int. Cl.[2] B23Q *7/10*
U.S. Cl. 29—809 **5 Claims**

1. Apparatus for distributing annular workpieces onto a plate provided with a plurality of bolts protruding from one surface of the plate, each bolt being arranged to arrest and hold a respective workpiece in proper position, said apparatus comprising: a drop magazine composed of a plurality of individual magazines each for accommodating a plurality of the workpieces with adjacent workpieces in contact with one another at their peripheral surfaces, said individual magazines each having a workpiece inlet end and a workpiece outlet end and all being arranged adjacent one another in a common plane, said drop magazine being oriented at an angle to the one plate surface, and being displaceable relative to the plate in that direction parallel to the one plate surface which corresponds to the direction of inclination of said magazine away from the one plate surface, said drop magazine further including partition

means delimiting said individual magazines and separating said individual magazines from one another, said partition means including, at the workpiece inlet ends of said individual magazines, partition members which are pivotal and movable laterally of the length of said individual magazines; and resilient holding means mounted at the end of said drop magazine adjacent the one plate surface for effecting individual release of successive workpieces onto successive bolts.

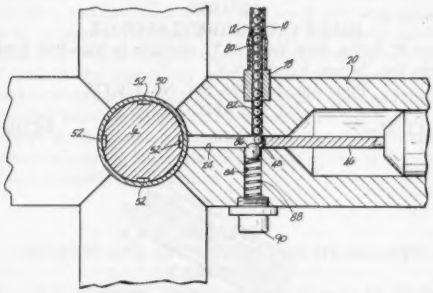


4,071,949

APPARATUS FUR SECURIN A SPHERICAL BODY TO A SUPPORTING MEMBER

Cecil Jack Ross, and John Fred Thompson, both of El Paso, Tex., assignors to W. R. Weaver, El Paso, Tex.

Filed Dec. 9, 1976, Ser. No. 748,792
Int. Cl.² B23Q *7/10*
U.S. Cl. 29—818 **2 Claims**



1. An apparatus for securing a ball to a relatively thin-walled telescopic sight erector tube, said apparatus comprising:

a. a mandrel for telescopingly receiving and supporting the erector tube during the securing operation, said mandrel having a free end over which the erector tube is moved when mounting and removing the erector tube from said mandrel, said mandrel being provided with at least one longitudinally extending groove formed in its outer surface, said groove extending to said free end of said mandrel;

b. a housing having a first bore therein which opens therefrom at a location directly opposite said mandrel groove, said housing having a second bore for receiving a stack of the balls, said second bore opening into said first bore;

c. means for feeding a succession of balls to said second bore;

d. means in said first bore for allowing only a single ball at a time to enter said first bore from said second bore;

e. moveable ball-setting means disposed in said first bore for reciprocal movement wherein a ball is picked up by said ball-setting means, advanced through said first bore and embeddedly fixed in the erector tube outer surface by said ball-setting means to an extent wherein the erector tube is locally deformed and bent inwardly into said mandrel groove; and

f. actuator means for moving said moveable means through its reciprocal movement cycle.

4,071,950

SCORING TOOL FOR FRANKFURTERS

George O. Telesio, 3760 Hermosa Place, Fullerton, Calif. 92635

Filed Nov. 11, 1976, Ser. No. 741,064
Int. Cl.² A22C *9/00*
U.S. Cl. 30—124 **8 Claims**

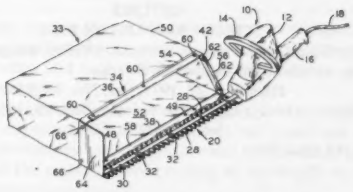
1. A tool for scoring the skin of a frankfurter or the like comprising: a flat plate having a pair of spaced parallel turned down edges spaced a distance at least substantially equal to the circumference of a frankfurter and the like, cutter means secured to and projecting from the surface of the plate and extending between said pair of edges, and handle means attached to the opposite side of the plate from the cutter means.

4,071,951

CLIPPINGS CATCHER FOR A HEDGE TRIMMER

Thagrus A. Burns, 8710 Maravilla Drive, Fort Wayne, Ind. 46805

Filed Apr. 18, 1977, Ser. No. 788,225
Int. Cl.² B26B *19/48*; A01G *3/04*
U.S. Cl. 30—132 **7 Claims**



4. In combination with a hedge trimmer having handle means and a motor driven elongated sickle blade assembly extending in one direction from said handle means, a clippings catcher comprising:

a rigid frame having spaced upper and lower sections and a pair of spaced side sections extending between said upper and lower sections, said frame sections defining a central opening,

said lower section being secured to said blade assembly and being substantially coextensive lengthwise therewith, and

a flexible bag having an opening, said bag being engaged by said frame perimetrically of said bag opening.

4,071,952

KNIFE AND SAFETY CAP

Avram Meshulam, Edison, N.J., and Jerome I. Rebold, Timonium, Md., assignors to CBS Inc., New York, N.Y.

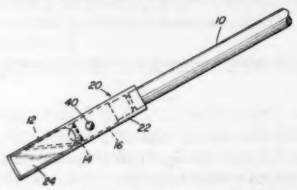
Filed Dec. 17, 1976, Ser. No. 751,906
Int. Cl.² B26B *29/04*
U.S. Cl. 30—151 **5 Claims**

1. In a cutting device having a rod-like handle of substantially uniform diameter for most of its length, and a cutting blade slightly wider than the diameter of the handle secured to one end of said handle by a chuck which includes a knurled sleeve having an outer diameter slightly larger than the diameter of the handle, the improvement consisting of a safety cap

adapted to be firmly held either over the cutting blade or to the other end of the handle, said safety cap comprising:

an elongated tubular housing having a circular cross-section for about one-half its length of a diameter slightly larger than the diameter of said handle and a rectangular cross-section for the remainder of its length, said housing being open at its circular cross-section end and closed at the other end, the width dimension of said rectangular cross-section portion being substantially equal to the diameter of said circular cross-section portion and slightly larger than the width of the cutting blade,

said circular cross-section portion having a plurality of narrow circumferentially spaced inwardly directed longitudi-



nally extending bosses formed on the inner wall thereof, the innermost surfaces of which define a circle having a diameter substantially equal to the diameter of said handle, at least one of which bosses extends radially inward from an elongated flexible tongue formed in and constituting part of the wall of said circular cross-section portion,

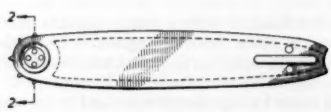
said inwardly directed longitudinally extending bosses firmly engaging said knurled sleeve and said rectangular cross-section portion receiving and covering said cutting blade when the safety cap is placed over the cutting blade, and said inwardly extending bosses firmly engaging said other end of the handle when said other end of the handle is inserted in the open end of said circular cross-section portion.

4,071,953

CHAIN SAW GUIDE BAR

Glenn Göran Egon Pantzar, Arsunda, Sweden, assignor to Sandvik Aktiebolaget, Sandviken, Sweden

Filed Jan. 27, 1977, Ser. No. 763,016
Claims priority, application Sweden, Jan. 29, 1976, 7600921
Int. Cl.² B27B *17/04*
U.S. Cl. 30—384 **10 Claims**



1. Chain saw guide bar with a sprocket wheel at its free end and which wheel supports the saw chain and is rotatably journalled on a hub and is surrounded by side plates, the part of the side plates that surrounds the sprocket wheel being formed by embossing of concentric zones (I, II, III), the embossing depth of which provides a gap between the side plate (**4**, **5**) and the sprocket wheel (**1**), which gap increases with the radial distance from the center (**6**) of the sprocket wheel.

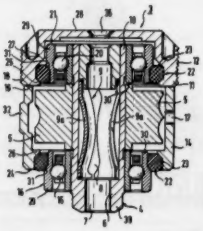
4,071,954

TURBINE INSERT FOR THE HEAD OF A DENTAL TURBINE ELBOW

Eugen Eibofner, Biberach an der Riss, Germany, assignor to Kaltenbach & Voigt, Biberach an der Riss, Germany

Filed Aug. 10, 1976, Ser. No. 713,280
Claims priority, application Germany, Aug. 28, 1976, 2618739
Int. Cl.² A61C *1/10*
U.S. Cl. 32—27 **11 Claims**

1. A turbine insert for insertion into a head-housing of a turbine elbow for dental use comprising: a rotatable axle having two ends and a plurality turbine blades disposed thereon, one of the axle-ends being adapted to receive a dental tool; a threaded cap attachable to the head-housing; support means for receiving said rotatable axle, the other of the axle-ends being rotatably supported in said threaded cap through said support means; and a protective sleeve surrounding said tur-



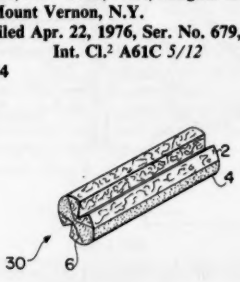
bine blades, formed with an opening for the passage of compressed air for driving the turbine, and at least partially surrounding and rotatably supporting the dental-tool receiving axle-end through said support means, said threaded cap, said rotatable axle and said support means for said axle being combined into a single unit before insertion into said head housing.

4,071,955

HIGHLY ABSORBENT SPONGE

Robert P. Julius, New York, N.Y., assignor to Nice-Pak Products, Inc., Mount Vernon, N.Y.

Filed Apr. 22, 1976, Ser. No. 679,175
Int. Cl.² A61C *5/12*
U.S. Cl. 32—34 **4 Claims**



1. A highly absorbent sponge for use as a dental sponge in oral cavities comprising:

means so less storage space than normal is required when in non-use and yet is greatly expandable during use so as to absorb three to five times the fluid and also to provide greater separation of oral tissues including;

a layer of highly absorbent cellulose sponge material of elongated shape and of sufficient smallness to easily fit within a person's mouth,

means for attachment of at least one layer of woven fabric-like outer material to a plane surface of said sponge material along a longitudinally extending center line thereof,

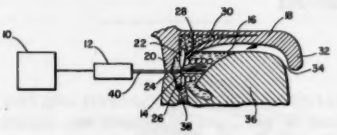
said layer of woven fabric-like material being substantially lint free so lint will not be left in the oral cavity when in use as a dental sponge,

and said longitudinal center attachment means permitting great expansion along the outer edges of both said sponge material thereby providing and said woven-like material for greater separation of the soft oral tissues during use as a dental sponge than the normal cotton roll.

4,071,956
METHOD AND MEANS FOR REMOVING DENTAL PLAQUE BY ULTRASONIC VIBRATIONS

John Barney Andress, 2 Altamira, Borger, Tex. 79007

Continuation of Ser. No. 412,571, Nov. 5, 1973, abandoned. This application Mar. 19, 1976, Ser. No. 668,680
Int. Cl.[2] A61H 9/00
U.S. Cl. 32—58 1 Claim

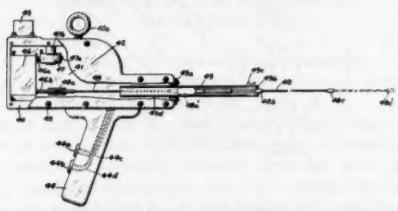


1. A device for removing dental plaque from and from between teeth by employing the oral cavity substantially filled with sufficient liquid to cover and surround said teeth as a resonance chamber for applied ultrasonic vibrations comprising: means for producing electromagnetic signal oscillations in excess of 15,000 Hz (cycles per second); means for transducing said electromagnetic signal oscillations to an ultrasonic frequency vibration; and means for applying said ultrasonic frequency vibrations to said liquid within said oral cavity to induce thereby ultrasonic frequency vibrations and cavitation within said liquid and within said oral cavity whereby said dental plaque may be removed from and from between said teeth by the said ultrasonic frequency vibrations and cavitation induced within said oral cavity and said liquid by said applied ultrasonic frequency vibrations, wherein the said means for applying said ultrasonic frequency vibrations to said liquid within said oral cavity to induce thereby ultrasonic frequency vibrations and cavitation within said liquid and with said oral cavity comprises vibrating means having a parabolic configuration in the horizontal plan corresponding to the general array of teeth in the oral cavity and a radius of curvature in the vertical plane corresponding to the Curve of Spee, and the said vibrating means is adjustable by virtue of having each of the arms of the parabolic configuration pivotable annd rotatable substantially in the horizontal plane about a point at the vertex of said parabolic configuration.

4,071,957
METHOD AND APPARATUS FOR MEASURING CARCASSES

Richard F. Sumption, Portsmouth, and Charles H. Wallace, Carrollton, both of Va., assignors to International Telephone & Telegraph Corporation, Nutley, N.J.

Continuation of Ser. No. 551,879, Feb. 21, 1975, abandoned, which is a continuation of Ser. No. 455,168, March 27, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 666,846
Int. Cl.[2] G01B 7/02
U.S. Cl. 33—174 L 10 Claims



1. Apparatus for measuring carcasses comprising:

a handheld measuring tool for sequentially making length and circumference measurements on a carcass and producing a signal representative of each measurement, said tool including

a tool body and guide nozzle mounted to said body,

a transducer mounted in said body,

a spring biased extendable output cable operatively connected to said transducer on one end and extending through said body passing through said nozzle and having a portion extending to the exterior of said body, said transducer producing a signal proportional to the extension of said cable, end means on said exterior portion of said cable having a cross sectional dimension that is larger than said cable,

means positioned at the outer end portion of said nozzle for engaging and positioning said end means when said cable is extended around a portion of said carcass for determining a circumference measurement;

terminal means coupled to said tool for receiving each said signal and storing a valve representing each measurement; and

said tool having switch control means for controlling sequentially the storage of each said signal in said terminal means when each measurement has been made.

3. A handheld measuring tool for making length and circumference measurements comprising:

a tool body having a cavity therein;

a guide nozzle mounted to said body with a passage into said cavity;

a hand grip mounted to said body for holding said tool in one hand;

a transducer mounted within said cavity and having a biased output cable operatively connected to said transducer on one end, said cable extends from said transducer through said passage in said nozzle and terminating in an end means having a cross sectional dimension that is larger than said cable outside said nozzle, said transducer producing a signal proportionate to the extension of said cable;

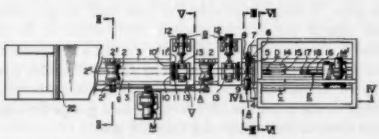
the terminal portion of said nozzle including an engagement member positioned and adapted for engaging the end means when said tool is making the circumference measurement; and

switch means operatively interconnecting said transducer and an output terminal means on said tool positioned for being activated by said one hand when the cable has been extended the amount corresponding to the length or circumference measurement.

4,071,958
DEVICE FOR INSPECTING INNER DIAMETER AND BENDING OF PIPE

Kazuo Morita, Aichi; Seiichi Asano, and Shigeharu Masuma, both of Handa, all of Japan, assignors to Aichi Steel Works, Limited and Kawasaki Steel Corporation, Kobe, both of, Japan

Filed Apr. 2, 1976, Ser. No. 672,956
Claims priority, application Japan, Apr. 4, 1975, 50-45416; Mar. 8, 1976, 51-27246
Int. Cl.[2] G01B 3/46, 5/12
U.S. Cl. 33—178 B 9 Claims



1. A pipe inspection device for inspecting the inner diameter and bending of a pipe by forcing a gauge through the pipe from one end thereof to the other end under the driving force of fluid under pressure, said device comprising

a stopper means swingably movable about an axis into and out of its pipe positioning position,

means for moving said stopper means about said axis,

pipe positioning means including a plurality of rollers, adjacent said stopper means which are driven to displace the pipe placed thereupon so as to bring the pipe into a predetermined inspection position in which one end of the pipe is brought into engagement with said stopper means,

pipe clamping means for clamping securely the pipe in said predetermined inspection position,

a gauge placed on a gauge positioning means near one end of the pipe

gauge firing means including

nozzle means for emitting fluid under pressure mounted for movement toward or away from one end of the pipe in said predetermined inspection position,

said movement of said nozzle means being coaxial of the pipe in said predetermined inspection position,

said nozzle means having such a longitudinal cross sectional configuration that when it moves toward said one end of the pipe, it may insert into the pipe said gauge placed on said gauge positioning means and when it is further moved, it may be brought into fluid-tight contact with said one end of the pipe, whereby the fluid under pressure may be admitted through said nozzle means behind said gauge in the pipe, thereby forcing said gauge through the pipe toward the other end thereof, and

stopper plate means disposed adjacent to the other end of the pipe in said predetermined inspection position for stopping said gauge discharged out of the other end of the pipe and preventing further flying of said gauge beyond said stopper plate means.

7. A pipe inspection device for inspecting the inner diameter and bending of a pipe by forcing a gauge through the pipe from one end thereof to the other end under the driving force of fluid under pressure, said device comprising

a fixed stopper means,

pipe positioning means including a plurality of rollers, adjacent said stopper means which are driven to displace the pipe placed thereupon so as to bring the pipe into a predetermined position in which one end of the pipe is brought into engagement with said stopper means,

carriage means including at least two carriages having a plurality of wheels and a pair of guide rails, said carriages being movable on said guide rails in either direction of the longitudinal axis of the pipe to be adjustable depending upon the length of the pipe,

pipe clamping means for clamping securely the pipe in a predetermined inspection position, said pipe clamping means being mounted on said carriage means,

shift means having at least one shift arm displaced transversely in a plane perpendicular to the longitudinal axis of the pipe on said pipe positioning means and cross feeding the pipe to said predetermined inspection position,

a gauge placed on a gauge positioning means near one end of the pipe,

gauge firing means including nozzle means for emitting fluid under pressure mounted for movement toward or away from one end of the pipe clamped by said clamping means on said carriage means,

said nozzle means having such a longitudinal cross sectional configuration that when it moves toward said one end of the pipe, it may insert into the pipe said gauge placed on said gauge positioning means and when it is further moved, it may be brought into fluid-tight contact with said one end of the pipe, whereby the fluid under pressure may be admitted through said nozzle means behind said gauge in the pipe, thereby forcing said gauge through the pipe toward the other end thereof, and

stopper plate means disposed adjacent to the other end of the pipe in said predetermined inspection position for stopping said gauge discharged out of the other end of the pipe and preventing further flying of said gauge beyond said stopper plate means.

4,071,959

GYRO-STABILIZED SINGLE-AXIS PLATFORM

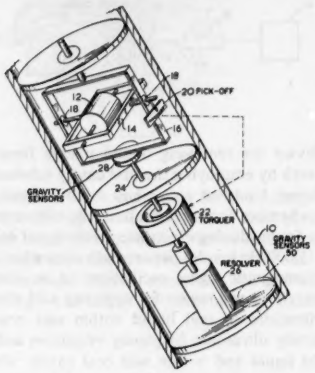
Michael King Russell, Lynworth House, Prestbury, and Anthony William Russell, The Bittams, Crippetts Road, Leckhampton, both of Cheltenham, England

Filed Mar. 23, 1976, Ser. No. 669,518

Claims priority, application United Kingdom, Mar. 26, 1975, 12456/75

Int. Cl.[2] G01C 9/06, 19/00

U.S. Cl. 33—312 8 Claims



1. An instrument for measuring the direction of a borehole comprising a case having a longitudinal axis coincident, in use, with the axis of the borehole, a single-degree-of-freedom gyro comprising an outer gimbal mounted in the case with its axis coincident with the longitudinal axis thereof, an inner gimbal mounted in the outer gimbal with its axis coincident with the outer gimbal axis, a gyro rotor mounted in the inner gimbal, means for sensing angular movement of the inner gimbal relative to the outer gimbal and applying a torque to the outer gimbal to rotate it about its axis so that the inner gimbal precesses back to its initial position, means for measuring the angle of rotation of the case about its longitudinal axis relative to the outer gimbal and a gravity sensor unit for measuring three components of gravity in three non-coplanar directions.

4,071,960

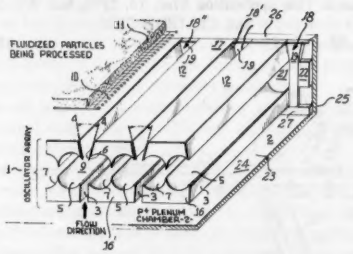
SYSTEM FOR ARTICULATE DRYING AND TRANSPORT

Romald E. Bowles, 2105 Sondra Court, Silver Spring, Md. 20904

Continuation-in-part of Ser. No. 535,118, Dec. 20, 1974, abandoned. This application Nov. 26, 1975, Ser. No. 635,420

Int. Cl.[2] F26B 17/04

U.S. Cl. 34—57 A 21 Claims



1. In combination for treating a bed of particulate material, a support for said bed of particulate material, said support being pervious to jets of gas, an array of jet sources underlying said support and directing jets of said gas against said bed, said array comprising plural oscillators, means applying said gas

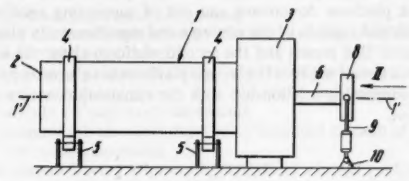
under pressure to all said plural oscillators, each of said oscillators including an interaction region, a discharge nozzle, a power nozzle for issuing a stream of fluid through said interaction region toward said discharge nozzle and at least one resonant chamber located along one side of said interaction region between said nozzles, and phasing means intercoupling said resonant chambers to produce phase coordinated sonic oscillations in said chambers.

4,071,961

DRYING DRUM FOR FLUID MATERIALS

Walter Dietzel, and Siegfried Matusch, both of Braunschweig, Germany, assignors to Braunschweigische Maschinenbauanstalt, Braunschweig, Germany

Filed July 21, 1972, Ser. No. 273,854
Claims priority, application Germany, July 23, 1971, 2136831
Int. Cl.² F27B 7/26; F26B 11/02
U.S. Cl. 34—108 **9 Claims**



1. A drying drum comprising a drum jacket having a rotational axis, roller bearing means for substantially horizontally supporting said drum jacket for location at least two positions along its length, a drive shaft extending coaxially with the rotational axis of said drying drum, means for securing said drum jacket to said drive shaft, gear drive means coupled to said shaft and mounted to follow non-rotational movements of said shaft whereby said drum and drive means form an integral operational unit, a fixed abutment means, elastically expandable linking rod means connected between said abutment means and said gear drive means for inhibiting rotation of said gear drive means with said shaft while enabling said gear drive means to follow other movements of said shaft, and fixedly mounted motor means and flexible shaft means coupling said motor means to said gear drive means.

4,071,962

ROTARY DRYERS

Walter C. Saeman, Cleveland, Tenn., assignor to Olin Corporation, New Haven, Conn.

Filed Mar. 29, 1976, Ser. No. 671,173
Int. Cl.² F26B 11/04
U.S. Cl. 34—135 **22 Claims**

1. A rotary dryer for solid material, comprising:

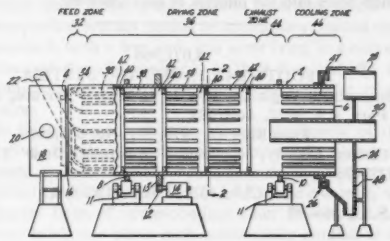
a. a hollow cylindrical shell having an upstream feed end and a downstream discharge end;

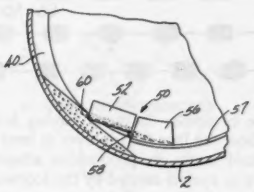
b. at least one set of circumferentially spaced flights;

c. an annular dam ring means, attached to the interior of said shell and projecting inwardly from said shell, said dam ring being spaced from said flights toward the discharge end of said shell, for forcing limited accumulation of a bed of material upstream from and adjacent to said dam ring;

d. a flight-free area in said shell between said flights and said dam ring; and

e. bed depth regulator means, attached to said dryer, for regulating the depth of said bed by transporting a selected portion of said bed of material from said flight-free area





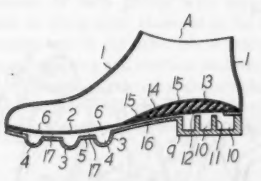
over said dam ring to the downstream side thereof upon rotation of said shell.

4,071,963

VENTILATED FOOTWEAR

Sadao Fukuoka, No. 3-4, 2-Chome, Shinminamifukushima Tokushima, Tokushima, Japan

Filed Dec. 15, 1976, Ser. No. 750,602
Claims priority, application Japan, Apr. 14, 1976, 51-46240
Int. Cl.² A43B 7/06
U.S. Cl. 36—3 B **11 Claims**



1. Ventilated footwear comprising: an outer sole having a hollow portion forming an air pumping chamber at the heel portion thereof; an inner sole having a plurality of ventilation holes communicating with said air pumping chamber; a cushion made of resiliently deformable material having continuous air cells of a selected thickness mounted on the upper surface of said inner sole at least at the heel portion thereof; a sheet envelope enclosing said cushion having a plurality of ventilation perforations therein; an outer sole made of resiliently deformable material at the tread surface thereof and having at least one hollow projection extending therefrom forming an internal cavity between the internal surface of said outer sole and the bottom surface of said inner sole, operative as an air distributing chamber; at least one elongated air duct communicating at one end thereof with said air pumping chamber and at the other end thereof with said air distribution chamber, said upper sole having a plurality of ventilation holes respectively facing said projection; whereby the weight of the wearer when applied to said heel portion is operative to close said ventilation perforations and depress said cushion to thereby forcibly propel air from said air pumping chamber through said air duct

and the weight of the wearer when thereafter applied to the forward area of said inner sole is operative to depress and deform said projection to thereby force air through said ventilation holes into the interior of said footwear.

4,071,964

FOOTWEAR FASTENING SYSTEM

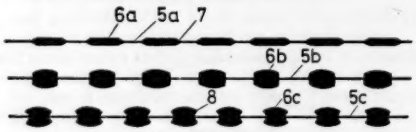
Constantinos Vogiatzis, Flat 1, 92 Lipsett Terrace, Brooklyn Park, S.A. 5032, Australia

Filed May 12, 1976, Ser. No. 685,889

Claims priority, application Australia, June 12, 1975, 13277/76

Int. Cl.[2] A43B *23/00*; A43C *7/00*

U.S. Cl. 36—50 **5 Claims**



1. A shoe or similar footwear having holes for a lace to fasten the shoe, the lace having over at least the end portions thereof spaced knobs or protrusions adapted to engage in shaped holes or eyelets carried by the footwear to receive the lace with the knobs or protrusions preventing the lace moving through the hole, characterized in that each protrusion on the lace has a resilient lip surrounding that portion of the lace connecting each protrusion, whereby the lip engages around the hole so that the lace is resiliently held even though the tension of the lace varies during flexing of the shoe.

4,071,965

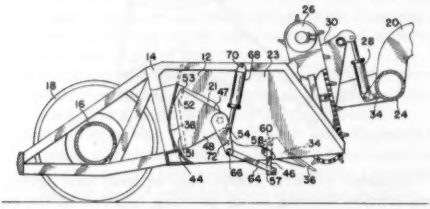
PIVOTED EJECTOR WITH HINGED DOOR FOR EARTHMOVING SCRAPERS

Emil B. Lee, Morton, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 28, 1975, Ser. No. 572,247

Int. Cl.[2] E02F *3/82*

U.S. Cl. 37—4 **3 Claims**



1. In a self-loading scraper having a frame, a bowl supported on said frame and having spaced side walls defining an open front and an open bottom, a cutting blade extending between said side walls and carried on said bowl forward of said open bottom, wheels on said frame, means for raising and lowering the forward part of said bowl to engage or disengage said cutting blade with a layer of soil and a movable bottom on said bowl covering said open bottom and being movable to an open position to dump the soil collected in said bowl, said bottom comprising a first platform and a second platform which platforms when aligned in the closed position lie in a common substantially horizontal plane, means mounting the first platform such that the weight of a portion of the contents in the bowl bearing on said first platform aids in moving both the first and second platforms from the closed to the open position, said means comprising first pivot means carried by the bowl and being connected to said first platform at a forward location on said first platform, said first pivot means being located in a horizontal plane spaced a short distance above said common substantially horizontal plane, whereby said first platform is pivotally mounted offcenter, second pivot means carried by said bowl and being connected to said second platform, said second pivot means being located in a horizontal plane spaced above said common substantially horizontal plane a distance several orders of magnitude greater than the distance between said common substantially horizontal plane and said horizontal plane containing said first pivot means, first link means pivotally connected to said first platform at a rearward location on said first platform, said location of said pivotal connection of said first link means being remote from said first pivot means on said first platform and on the opposite side of the midportion of the first platform from said first pivot means, second link means fixedly attached to said second platform in the vicinity of said second pivot means, said first and second link means being pivotally connected together, and power means mounted on the frame and connected to said second link means whereby actuation of said power means creates a force on the links which when added to the force created by the weight of a portion of the contents of the bowl bearing on the offcenter mounted first platform is sufficient to pivot the first link and first platform downward and out of supporting relationship with said portion of the contents and simultaneously pivot the second link means and the second platform about the second pivot means to pivot the second platform in an arcuate path out of supporting relationship with the remaining contents of the bowl.

4,071,966

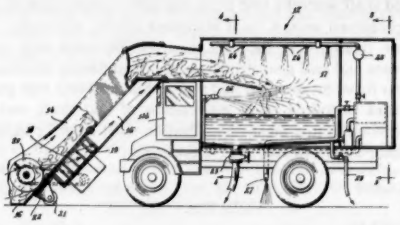
APPARATUS FOR REMOVING SNOW FROM ROADWAY

Nathan Cohen, 89 Bradley St., North Haven, Conn. 06473

Filed Nov. 23, 1976, Ser. No. 744,441

Int. Cl.[2] E01H *5/10*

U.S. Cl. 37—12 **1 Claim**



1. In a road vehicle apparatus for removing snow and the like from the surface of a roadway as the apparatus advances along the roadway wherein the apparatus includes a storage chamber for holding the snow taken up by the apparatus advancing on the roadway, the improvement in means for removing the snow from the surface of the road and depositing the removed snow in the storage chamber, said improvement comprising

(a) an elongated first conduit having an intake first opening at one end for receiving the snow from the roadway and a discharge second opening at its opposite end directed to discharge into the storage chamber;

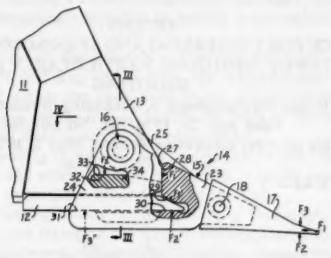
(b) an elongated second conduit mounted on the first conduit having its intake opening connected into the first conduit adjacent the intake opening of the first conduit and its discharge opening adjacent the discharge opening of the first conduit; and

(c) damper means at its intake opening regulating the amount of snow material received from the first conduit.

4,071,967
QUICK CHANGE CORNER TOOTH ASSEMBLY FOR LOADER BUCKETS

Gene R. Klett, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 21, 1977, Ser. No. 761,102
Int. Cl.[2] E02F 9/28
U.S. Cl. 37—141 T 10 Claims



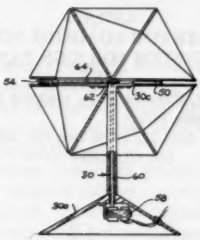
1. A work implement comprising
a pair of laterally spaced end walls each defining a surface on a forward edge thereof,
a horizontally disposed cutting edge having a forward edge and extending between said end walls and secured forwardly on said work implement,
a corner tooth assembly detachably mounted on each of said end walls comprising
an adapter having a forwardly extending adapter portion,
an earthworking tip detachably mounted on said adapter portion,
a pair of laterally spaced outer and inner mounting portions formed integrally with said adapter and defining a first slot therebetween and straddling said end wall, whereby said end wall is accommodated in said first slot,
a bottom portion integrally secured to said outer portion and spaced vertically downwardly from said inner portion to define a second slot therebetween, said cutting edge disposed in said second slot,
first force transmitting means, formed rearwardly on said adapter portion, abutting at least one of the forward edges of said end wall and said cutting edge in bearing contact therewith,
second force transmitting means formed on said outer portion and abutting an underside of said cutting edge in bearing contact therewith, and
third force transmitting means formed on an underside of said inner mounting portion and abutting a bearing pad formed integrally on an inboard side of said end wall in bearing contact therewith, and
fastening means extending transversely through said inner and outer mounting portions and through said end wall for detachably mounting said adapter on said end wall.

4,071,968
HEXAGONALLY SHAPED ROTATING DISPLAY WITH TETRAHEDRAL ELEMENTS

Charles J. Polizzi, 3219 Lees Ave., Long Beach, Calif. 90808, and Charles R. DeCola, 10913 National Blvd., West Los Angeles, Calif. 90805

Continuation of Ser. No. 359,347, May 11, 1973, abandoned, which is a continuation-in-part of Ser. No. 182,099, Sept. 20, 1971, abandoned. This application Aug. 3, 1976, Ser. No. 711,290
Int. Cl.[2] G09F 11/02
U.S. Cl. 40—473 1 Claim

1. A mobile substantially hexagonal display comprising, in combination:
a) two groups of three tetrahedran elements each, the faces of each element having substantially the shape of an isosceles triangle, the elements in each group being flexibly hinged together along opposite edges thereof, and the free edges of the outer elements of each group which are substantially at right angles to the hinged edge of their respective element, including at the center thereof, a further hinge defining and rotation receiving means;
b) a supporting bracket having two stationary, spaced apart, arms each with a free end, said arms lying in a common plane and directly engaging, at their free end, the two groups of elements for supporting the elements for relative motion;
c) the six elements presenting, during the course of their relative motion, a changing substantially hexagonal shaped and substantially continuous display surface collectively formed by one face of each of the elements, with adjacent faces of corresponding outer elements in each group lying in a plane each substantially parallel to said common plane when the substantially continuous display surface is formed;



d) pivot means mounted at the free end of each arm, said pivot means being engageable with the further hinge defining and rotation receiving means of the outer elements of each group for effecting thereby the engagement of the arms to the two groups of elements; and
e) drive means engaging the pivot means on one arm for imparting to said pivot means a rotation which is transmitted by said pivot means and through the corresponding further hinge defining and rotation receiving means to one outer element of each group, with the rotation being transmitted by these outer elements to the other elements in each group and to the other pivot means through the further hinge defining and rotation receiving means of the other outer elements, whereby the visible faces of said elements are collectively changed to form said substantially hexagon shaped and substantially continuous display surface.

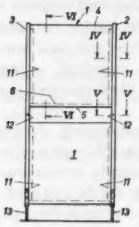
4,071,969
COLLAPSIBLE DISPLAY ELEMENTS

Harry L. Tonhäuser, Pilgramstrasse 2, 7100 Heilbronn, Germany

Filed June 17, 1975, Ser. No. 587,659
Claims priority, application Germany, Oct. 15, 1974, 7434417[U]
Int. Cl.[2] G09F 1/00
U.S. Cl. 40—610 20 Claims

1. A collapsible display device comprising at least one display carrier means for visibly supporting a displayed article, and at least a pair of separate support means, each arranged at opposite sides of said display carrier means for supporting said display carrier means on a surface, said display carrier means being a tubular member of a flat material, said tubular member having vertical walls defining at least one display surface and having an open end adjacent each of said pair of support means at respective sides of said vertical walls, each of said supporting means including at least one connecting tongue arranged laterally of said tubular open end at respective sides of said

vertical walls, and each of said connecting tongues hingedly connecting said support means to said display carrier means to



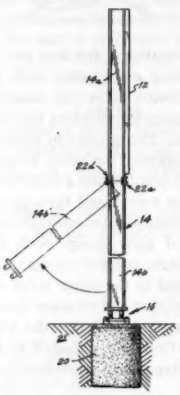
define a foldable connection of each of said support means with said display carrier means.

4,071,970

HINGE PLATE FOR ROADSIDE POST SAFETY BREAKAWAY SYSTEM FOR SIGN PANELS AND THE LIKE

Richard A. Strizki, Ringoes, N.J., assignor to Transpo-Safety, Inc., New Rochelle, N.Y.

Filed Apr. 27, 1976, Ser. No. 680,753
Int. Cl.[2] G09F *7/18*
U.S. Cl. 40—607 **18 Claims**



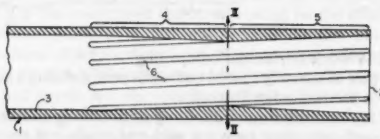
1. A roadside post safety breakaway system for sign panels and the like, comprising a plurality of posts each having upper and lower post portions joined at post cut lines, the sign panel or the like being mounted on the upper post portions proximate to and above said post cut lines; breakaway means for removably connecting said lower post portions to footings embedded in the ground or other supporting surface and for releasing said lower post portions from the footings upon impact therewith by a moving vehicle; and a plurality of hinge plates of substantially planar configuration associated with each post, at least one pair of plates being spaced from each other and disposed on opposite sides of said posts each of said plates being independently fixedly connected to its respective side of said posts and bridging said post cut lines, each hinge plate having a first hinge portion fixedly connected to a respective upper post portion and a second hinge portion fixedly connected to an associated lower post portion to connect associated upper and lower post portions of each post to each other, said first and second hinge portions of each hinge plate being separated by a weakened line portion, the material and configuration of said hinge plate and weakened line portion being selected to cause the hinge plates mounted on the impact side of said posts to rupture substantially in tension only at said weakened line portion while causing the hinge plates mounted on the side of said posts opposite to said impact side to bend, whereby impact by a moving vehicle with a post and severance of said breakaway means severs some of said hinge plates and permits the vehicle to deflect the impacted post about the remaining hinge plates while the post remains attached to the associated upper post portion on the sign panel or the like to prevent secondary collisions with the advancing vehicle or other objects or persons in the immediate collision area.

4,071,971

DEVICE FOR INCREASING AND STANDARDIZING THE SCATTER OF SHOTGUNS, PARTICULARLY FOR SKEET SHOOTING

Olle Tornas, Berghallavagen 8, Jonkoping, Sweden

Filed Apr. 29, 1976, Ser. No. 681,564
Claims priority, application Sweden, May 5, 1975, 7505163
Int. Cl.[2] F41C *21/00*
U.S. Cl. 42—79 **14 Claims**



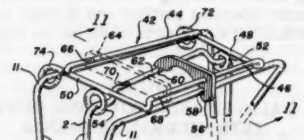
1. A device for increasing and standardizing the scatter of shot pellets discharged from the muzzle of a shotgun barrel having at its breech end a substantially cylindrical contour, comprising converging interior wall means adjacent the muzzle of the gun barrel, a number of grooves in said wall means set at a small angle relative to the geometric axis of the barrel, characterized in that the bottoms of the grooves are on a circle coaxial with and conforming to said cylindrical contour, and the depth of said grooves is greater than the radius of said shot pellets.

4,071,972

FRAME AND FILAMENT TRIGGER FOR ANIMAL TRAPS

Frank Conibear, Victoria, Canada, assignor to Woodstream Corporation, Lititz, Pa.

Continuation-in-part of Ser. No. 479,082, June 13, 1974, abandoned. This application May 6, 1976, Ser. No. 683,655
Claims priority, application Canada, June 12, 1975, 229239
Int. Cl.[2] A01M *23/26*
U.S. Cl. 43—92 **11 Claims**



1. In an animal trap of the type having similar first and second frames, each frame having sides serving as jaws and ends extending therebetween and which are pivotally connected through adjacent ends for relative rotation between set and closed positions about a common axis, an actuator capable of rapidly and forcefully effecting such rotation, and a mechanism for releasably maintaining the jaws in open, set position, an improved trigger comprising:

a generally U-shaped three-sided trigger frame rotatably

mounted at the base thereof to one of said trap frame sides, said trigger frame circumscribing an area equal to a substantial portion of the total area of the passageway through the open, set trap;

a filament having an extremely thin cross-section attached to and spanning the inner area of said trigger frame such that an animal sought to be caught cannot pass through or around said trigger frame without nudging the trigger frame or filament to activate the release mechanism, said filament having a cross-section such that said filament is from substantially invisible to having a cobweb-like appearance;

attachment means for rotatably connecting the trigger frame to one of said trap frame sides, the trigger frame being disposed within the open jaws of the trap for activating said release mechanism to enable the jaws of the trap to close, said attachment means comprising:

a trigger-bearing frame attached to one jaw of one frame of the trap and extending, when the trap is in the open, set position toward the other frame of the trap;

pivotal mounting means for the generally U-shaped, three-sided trigger frame on the trigger-bearing frame, the generally U-shaped, three-sided trigger frame pivoting around a pivotal axis;

a catch pivotally mounted on the trigger-bearing frame remote from the jaw to which the trigger-bearing frame is attached, the catch being adapted to engage the jaw of the trap remote from the jaw to which the trigger-bearing frame is attached and having means to abut the generally U-shaped, three-sided trigger frame; and

abutment means on the generally U-shaped, three-sided trigger frame extending out of the pivotal axis to abut the abutment means on the catch.

4,071,973

METHOD OF ARTIFICIALLY GROWING EDIBLE FUNGI

Chiyokichi Iizuka, 121 Shimizu, and Masaru Takeuchi, 254 Shimizu, both of Noda, Chiba, Japan

Continuation-in-part of Ser. No. 577,006, May 13, 1975, abandoned. This application Mar. 15, 1977, Ser. No. 777,841

Int. Cl.[2] A01G *1/04*

U.S. Cl. 47—1.1 **4 Claims**

1. A method for artificially growing shiitake or hiratake comprising the steps of setting the edible fungus sporiferous source in a nutrient medium, culturing the inoculated original hypha in a cultivation room at a temperature of from 18° to 20° C and 60% relative humidity wherein the surface of the nutrient medium is illuminated at a luminous intensity of 30 to 50 lux until the hypha become prevalent over the nutrient medium surface, and subjecting the prevalent hypha to a high temperature treatment at between 25° to 32° C for 24 to 48 hours and then to a low temperature treatment at between 5° to 8° C for 3 to 5 days, wherein during the high and low temperature treatments of the prevalent hypha the surface of the nutrient medium were illuminated at a luminous intensity of 100 to 120 lux and oxygen is forcibly supplied into a polyethylene sack accomodating the nutrient medium when the medium is taken out together with the sack from a cultivation vessel and dipping the nutrient medium into water at a temperature of from 3° to 6° C for 24 to 48 hours and then placing the hypha in a room at 10° to 16° C having a relative humidity of 90% and recovering the fungus.

4,071,974

THERMAL RETAINING GARDEN WATER BLANKET

Ralph N. Tripp, Jr., 775 Fairacres Ave., Westfield, N.J. 07090

Filed Aug. 2, 1976, Ser. No. 710,560

Int. Cl.[2] A01G *13/00*

U.S. Cl. 47—2 **4 Claims**

1. In a thermal energy retaining means for use in covering soil adjacent growing plants and having a water tight elongated tubular sleeve enclosure of plastic film with open ends and with support means at opposed ends thereof and being further characterized in that:

a. said support means comprising hanger means at opposed ends of said elongated tubular sleeve and comprising a generally inverted "U" shaped bracket with a pair of generally parallelly disposed spaced apart legs with a first cross-member extending between said legs at the top thereof;

b. a second cross-member slidably coupled to the spaced apart legs of said "U" shaped bracket and extending generally parallel to said first cross-member to form a jaw with said first member when adjacent thereto to receive said elongated tubular sleeve therebetween; and

c. the length of said cross-members being at least equal to the width of said elongated tubular sleeve and being arranged to form a winding core for the opposed open ends of said tubular sleeve for sealing the ends and adjusting the axial length thereof.

4,071,975

METHOD OF PROMOTING THE GROWTH OF PLANTS

Kazunobu Tanaka; Masahiko Kusumoto, and Shoji Watanabe, all of Ohimachi, Japan, assignors to Daicel Ltd., Tokyo, Japan

Division of Ser. No. 561,282, March 24, 1975, Pat. No. 3,991,138. This application Apr. 12, 1976, Ser. No. 676,321

Claims priority, application Japan, Mar. 30, 1974, 49-36402

Int. Cl.[2] A01G *7/00*

U.S. Cl. 47—9 **10 Claims**

1. A method of promoting the growth of plants which comprises applying to the surface of a plant growth medium to be exposed to a source of ultraviolet radiation a pre-formed light-degradable mulching film for agricultural use, said film being made of a resin composition whose resin components consist essentially of

(1) from 5 to 50 percent by weight of polyisobutylene oxide resin having a reduced specific viscosity of at least about 0.8 dl/g. determined at 120° C in o-dichlorobenzene,

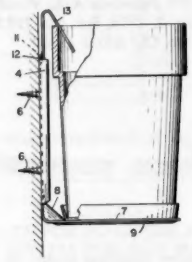
(2) the balance is a second resin component selected from the group consisting of (a) at least one polyolefin resin and (b) a mixture of at least one polyolefin resin and at least one polydiene resin,

said film being capable of being transformed to a friable or pulverized form by the action of sunlight in from 15 to 90 days.

4,071,976
HOLDING DEVICE

Albert J. Chernewski, Brooklyn, N.Y., assignor to House of Hints Corporation, Brooklyn, N.Y.

Continuation of Ser. No. 556,228, March 7, 1975, abandoned.
This application Apr. 15, 1977, Ser. No. 787,871
Int. Cl.[2] A47G 7/00
U.S. Cl. 47—39 3 Claims

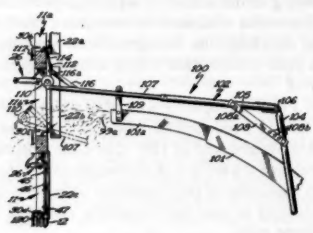


1. A device for mounting and holding a flower pot or the like in spaced relationship to a wall or other vertical surface, said device comprising an L-shaped unit having a vertically extending portion adapted to be secured to the wall or vertical surface through spaced holes arranged centrally thereof and through which screws or the like can pass, the vertically extending portion having its edges inturned to form U-shaped channels of a width leaving said holes exposed, ribs extending along the vertically extending portion underlying the inturned edges and substantially coextensive in length therewith and a horizontally extending portion integral with the said vertically extending portion and provided with ribs on which the flower pot or the like rests, the juncture formed between the vertically and horizontally extending portions having an angularly disposed protuberance strengthening the juncture against downward movement of the horizontally extending portion under the weight of the flower pot or the like and said ribs providing airspace below the bottom of the flower pot or the like, said device also comprising a separate holding member slidable in said channels, having ribs matching with the ribs in the vertically extending portion and an angularly downturned upper end adapted to extend over the top of the flower pot or the like in stabilizing contact therewith. the lowermost edge of the slidable member having a central inverted V-shaped notch for reception of the angularly disposed protuberance and for limiting downward movement of the slidable member.

4,071,977
AUTOMATIC SILO DOOR CONSTRUCTION

Raymond R. Price, Rochester, Minn., assignor to Rochester Silo, Inc., Rochester, Minn.

Filed July 29, 1976, Ser. No. 709,935
Int. Cl.[2] E06B 7/00; B65G 65/34; E05C 15/00; E05F 1/10
U.S. Cl. 49—70 41 Claims



1. Silo door apparatus adapted to be mounted on a silo, said silo comprising at least one silage discharge orifice, said door apparatus comprising:

a door member for selectively blocking a first pre-defined silo door orifice;

door hinge means for revolvably mounting said door member to said silo whereby said door may be moved between closed and open positions;

retractable gun means for selectively opening said door member, said gun means comprising:

a first rigid elongated member;

a second rigid elongated member coupled to said first elongated member and axially movable with respect thereto;

means coupling one of said first and second elongated members to said door member; and

means for biasing one of said first and second elongated members outwardly with respect to the other of said first and second elongated members, thereby urging said door member toward an open position; and

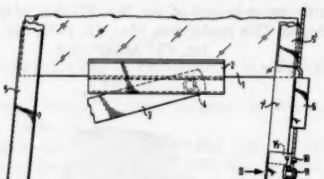
trigger means for selectively activating said gun means when desired to open said door member; and

gun hinge means for revolvably securing said gun means to said silo, said gun hinge means facilitating pivoting of said gun means against a portion of said silo in response to retraction of said gun means whereby said door member is wedged into a closed position firmly abutting said silo door orifice.

4,071,978
WINDOW ARRANGEMENT WITH SLIDING PANE

Hans Rampel, Eicha; Peter Hess, and Herbert Becker, both of Coburg, all of Germany, assignors to Metallwerk Max Brose & Co., Coburg, Germany

Filed July 21, 1976, Ser. No. 707,385
Claims priority, application Germany, Aug. 22, 1975, 2537536
Int. Cl.[2] E05F 11/48
U.S. Cl. 49—348 2 Claims



1. A window arrangement comprising:

a. a support;

b. first and second channel members mounted on said support,

1. said channel members being elongated in a common direction and spaced transversely of said direction,

2. a portion of said first channel member projecting beyond said second channel member in said direction;

c. a guide member mounted on said support and defining a guide groove spacedly aligned with said second channel member in said direction and coextensive in said direction with said portion of said first channel member;

d. a compressible, elongated liner member, respective longitudinal sections of said linear member being received in said second channel member and in said groove;

e. barb means projecting from said guide member into said guide groove and engaging said liner member for impeding movement of the liner member toward said second channel member with greater force than movement of the liner member away from said second channel member;

f. a window pane simultaneously received in said channel members; and

g. operating means for moving said window pane in said direction into and out of said guide groove, one of said sections of said liner member being interposed between the window pane and said second channel member and the other section being interposed between said window pane and said guide member when said window pane is in said guide groove.

4,071,979

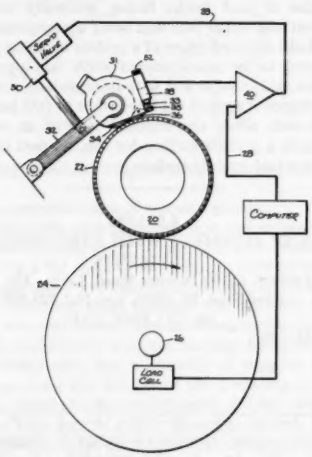
SENSOR SHOE FOR TIRE GRINDING MACHINE

John Walter Ugo, Warren, Mich., assignor to Uniroyal, Inc., New York, N.Y.

Continuation of Ser. No. 596,868, July 17, 1975, abandoned. This application Feb. 23, 1977, Ser. No. 771,213

Int. Cl.[2] B24B *5/00*

U.S. Cl. 51—106 R **12 Claims**



1. In a machine for grinding the surface of the tread of a rotating pneumatic tire, said machine having a grinding wheel and a sensor shoe adjacent said wheel for tracking said tread surface and for positioning said grinding wheel substantially adjacent said tread surface, and said tread having a plurality of spaced apart projections forming recesses therebetween, the combination comprising:

a sensor shoe having a tracking surface for contacting said tread surface and for bridging said recesses during rotation of the tire, said tracking surface having a length curved toward said tire whereby greater than one point contact between the tread surface and the tracking surface may be effected; and

means connected to the sensor shoe for positioning said shoe such that optimum contact between the tread surface and tracking surface may be attained.

4,071,980

HONING MACHINE PROVIDED WITH A POWER CONTROLLER

Yoshiki Kubo, Hiroshima, Japan, assignor to Toyo Kogyo Co., Ltd., Japan

Filed Feb. 28, 1977, Ser. No. 773,117

Claims priority, application Japan, Mar. 1, 1976, 51-22449

Int. Cl.[2] B24B *49/18*

U.S. Cl. 51—165.87 **14 Claims**

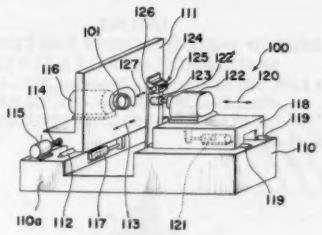
1. A honing machine for grinding and polishing a work piece by a grinding wheel slidingly passing along a surface of the work piece to be worked on, said grinding wheel being connected to a grinding wheel driving motor and being sharpened, after predetermined number of grinding operations, through dressing, said honing machine comprising;

(a) a grinding unit including the grinding wheel for carrying out a grinding operation;

(b) the grinding wheel driving motor connected to said grinding wheel;

(c) power adjusting means including power establishing means for establishing a power necessary to run the grinding unit and for producing a first signal indicative of said established power and power detecting means for detecting power consumed in the grinding wheel driving motor and for producing a second signal indicative of the detected power;

(d) a comparator for comparing said first signal with said second signal and for producing a third signal to be fed to grinding unit; and



(e) correcting means including diameter detecting means for detecting a degree of change of the grinding wheel diameter and for producing a fourth signal indicative of the detected value, initial diameter setting means for setting the initial diameter of the grinding wheel and for producing a fifth signal indicative of the initial diameter of the grinding wheel and calculation means for calculating, upon receipt of said fourth and fifth signals, a correction value which is in relation to a rate of change of grinding wheel diameter and for producing a correcting signal indicative of the calculated correction value, said correcting signal being provided to said power adjusting means for varying said third signal for controlling said power to be consumed in said grinding unit.

4,071,981

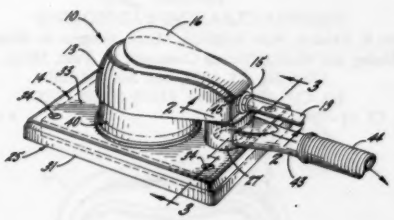
PORTABLE ABRADING MACHINE WITH DUST COLLECTING SYSTEM

Roy J. Champayne, c/o National-Detroit, Inc., 2810 Auburn St., Rockford, Ill. 61103

Filed Dec. 3, 1976, Ser. No. 747,406

Int. Cl.[2] B24B *23/00*

U.S. Cl. 51—170 MT **3 Claims**



1. An abrading machine comprising a hollow case, a rotary motor within said case, an abrading shoe located beneath said case, drive mechanism within said case and connected between said motor and said shoe to cause the latter to move with non-rotary motion relative to said case and said motor, a dust shroud connected to said shoe to move in unison with the shoe, said shroud comprising a top wall located above and spaced

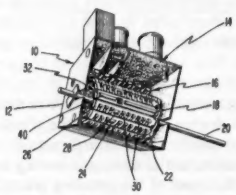
upwardly from the top of said shoe and further comprising a skirt depending from said top wall and extending around the outer periphery of said shoe, said skirt being spaced outwardly from the periphery of said shoe whereby abrading dust may pass into said shroud between said skirt and the periphery of said shoe, a hole extending through said top wall of said shroud, a hollow, downwardly opening fitting rigid with and located outside of said case and communicating with said hole, said fitting being sufficiently large to remain in communication with said hole in all positions of said shoe and said shroud, and means on said fitting for receiving a line for creating suction in said fitting and said shroud whereby abrading dust may be sucked into said shroud and passes through said hole and into said fitting and said suction line.

4,071,982

METHOD AND IMPLEMENT FOR CLEANING SPRING-CONTACTS OF A TUNER

Marvin Linn, 150 Marine Ave., Brooklyn, N.Y. 11209

Filed Dec. 28, 1976, Ser. No. 755,024
Int. Cl.[2] B24B *19/00, 1/00;* **H03J** *5/00*
U.S. Cl. 51—241 S **4 Claims**



1. A cleaning implement for cleaning fixed spring-contacts of a cylindrical, drum-type tuner having replaceable contact-carrying strips arranged about the circumference of a rotatable drum, comprising:

a support element in the form of a substantially rectangular sheet of material;

means on said support element for removably attaching said element to the drum over a contact-carrying strip of the tuner; and

cleaning means in the form of a layer of abrasive material on said support sheet for engaging and cleaning the fixed spring-contacts of the tuner upon rotation of said drum;

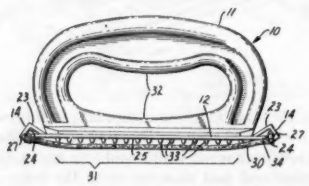
said attaching means including tabs on said sheet at each end thereof for snap-on engagement with opposite ends of the tuner drum whereby said support element can be snapped over a contact-carrying strip for cleaning.

4,071,983

GRIDDLE CLEANING PAD HOLDER

James E. Thielen, New Brighton, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 21, 1977, Ser. No. 761,250
Int. Cl.[2] A47L *13/34, 13/46;* **B24D** *15/00*
U.S. Cl. 51—393 **3 Claims**



1. A griddle cleaning pad holder for hand use for holding a stiff but resilient griddle cleaning pad, comprising, in combination:

an elongated flat base plate having an upper face, a lower face, parallel sides, opposite intermediate end portions, and end tab portions on either side of said intermediate end portions projecting from the line defining the extension of said intermediate end portions to said sides and having outer edges defined by the extension of said parallel sides;

a handle member secured to the upper face of said base plate; and

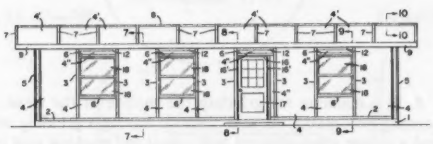
a pair of rigid hooks, each of said hooks having a mouth and a shank, one of said shanks being secured to and projecting from each of said opposite intermediate end portions of said base plate, the shanks of said hooks projecting above the plane of said plate toward said handle at an angle between about 20° and 60° with respect to said plate, the mouths of said hooks facing generally inwardly and toward said lower face and being dimensioned to receive and hold opposed edges of a griddle cleaning pad of a size adapted to be accomodated with said opposed edges within said mouths and with intermediate portion of said pad disposed against the lower face of said base plate, and such that, when the exposed face of an engaged pad contacts a griddle surface for use, no part of said hooks contact said griddle surface.

4,071,984

HOUSE ASSEMBLY WITH PREFABRICATED ELEMENTS

Kenneth Larrow, 13100 Belcher Road, Largo, Fla. 33540

Filed Sept. 16, 1976, Ser. No. 723,809
Int. Cl.[2] E04C *1/00*
U.S. Cl. 52—79.1 **14 Claims**



1. Prefabricated structural materials, comprising in combination:

a plurality of panels each having an inner core of an insulating material interposed between two sheet materials laminated to said inner core;

said inner core of insulating material being at least a major portion of the thickness of said panel;

a plurality of supporting pillars each having one or more linear grooves therein of an appropriate width and depth to embrace and hold the edge portions of said panels;

first means establishing said plurality of pillars to be spaced relative to adjacent pillars such that the distance between the bases of facing grooves of adjacent pillars is commensurate with the width of said panel;

a plurality of joists each having one or more linear grooves therein of an appropriate width and depth to embrace and hold the edge portions of said panels;

said plurality of joists being spaced relative to adjacent joists such that the distance between the bases of facing groove of adjacent joists is commensurate with the length of said panels;

said plurality of panels being insertable into adjacent facing grooves of said pillars and joists to form a building structure;

window means including a plurality of window joists extending between first selected adjacent pillars;

said window means including a plurality of window splines cooperating with said grooves of said window joists and said first selected adjacent pillars;

door means including a door joist extending between second selected adjacent pillars; and

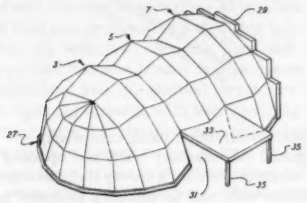
said door means including a plurality of door splines cooperating with said grooves of said door joist and said second selected adjacent pillars.

4,071,985

ARCH AND BUILDING CONSTRUCTION

Chester F. Wickwire, 90 S. Main St., Homer, N.Y. 13077

Filed Mar. 17, 1976, Ser. No. 667,628
Int. Cl.[2] E04B *1/32*
U.S. Cl. 52—86 **4 Claims**



1. A building structure comprising a plurality of rigid arches, wherein:

the arches comprise pairs of wooden panels;

the pairs of panels each including first and second wooden trapezoidal panels; each of said first and second panels comprising a flat sheet of substantially rigid material having a trapezoidal configuration and including one long parallel side, one short parallel side opposite the long parallel side, and non-parallel sides connecting the ends of said long parallel side with the corresponding ends of the short parallel side, and a plurality of support members extending along the borders of the panel and being substantially perpendicular to the panel; the first and second panels of each pair of panels being contiguous, with the long parallel sides of the first and second panels being in an opposed, abutting relationship; and reinforcing means disposed between said first and second panels; and

each pair of panels being in an abutting relationship with another of said pairs of panels, with the non-parallel sides of each of said abutting pairs of panels being in an opposed, abutting relationship with each other; the abutting pairs of panels collectively forming the arch; the arch being bounded on its sides by the short parallel sides of the panels forming the arch; and

said arches being juxtaposed in a side-by-side relationship with the short parallel sides of the arches abutting corresponding short parallel sides in adjacent arches, said arches collectively forming said building structure.

4,071,986

BUILDING STRUCTURE

Chester F. Wickwire, 90 S. Main St., Homer, N.Y. 13077

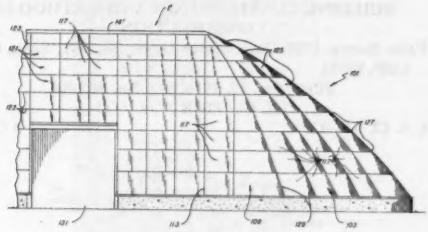
Filed June 21, 1976, Ser. No. 697,713
Int. Cl.[2] E04B *1/32*
U.S. Cl. 52—86 **7 Claims**

1. An elongated building structure comprising:

a pair of flank members disposed in an opposing relationship and being generally identical in configuration and orientation, the flank members having opposing base edges spaced from each other and defining the base span of the structure, upper edges meeting to define a peak of the structure, convex contours each approximately the shape of a segment of a cylinder whose radius of curvature exceeds one half of said base span, and being symmetrical about a central plane including said peak and being perpendicular to ground, and having co-planar end surfaces defining an open end to said flank members, said flank members each comprising:

a plurality of generally rectangular panels, the panels being disposed in edgewise abutment with adjacent panels at junctures parallel to each other and to ground, the abutting surfaces being bevelled to cause the abutting panels to collectively define an outward convexity in the flanks; said panels including rigid, planar face plate members defining exterior and interior surfaces of said structure, and support walls perpendicular to and bordering the interior surfaces of the face plate members, said support walls having heights at least sufficient to withstand tensile and compressive stresses existing at the respective support walls; and

an end structure closing the open end of said flank members, said end structure comprising:



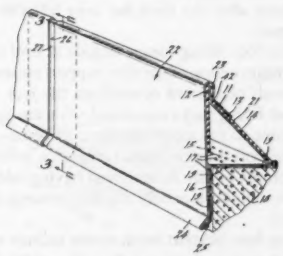
a set of sections collectively approximating one half of a polyhedron whose cross section is one half of a regular polygon, two of said sections having exterior surfaces extending from the exterior surfaces of said elongated building at said open end towards said central plane, all of said sections being juxtaposed collectively forming a continuous surface connecting the exterior surfaces of said flanks; each of said sections extending from a common juncture at an end of said peak to a base at the ground, and comprising trapezoidal panels and a plurality of rectangular panels, the rectangular panels having generally side walls bevelled to abut corresponding side walls of adjacent panels to provide each section with a convexity generally equal to the convexity of said arches.

4,071,987

GRAVEL STOP

John B. Hickman, Asheville, N.C., assignor to W. P. Hickman Company, Inc., Asheville, N.C.

Filed June 18, 1976, Ser. No. 697,436
Int. Cl.[2] E04D *13/5*
U.S. Cl. 52—94 **12 Claims**



1. In a spring unit forming a gravel stop at the edge of a roof made of a sheet of spring material having vertical, horizontal and angular portions forming a spring unit with top and bottom edges, means for supporting the unit along the edge of a roof on the horizontal portion with the vertical portion extending downwardly therefrom, the top of the angular portion being moved downwardly when the angular portion is deflected, and

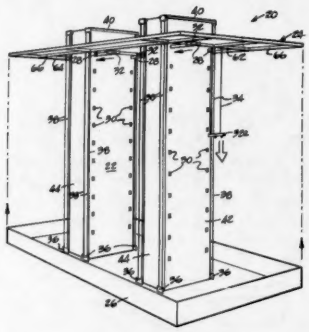
flat fascia members having channel elements along the top and bottom edges which face in opposite directions toward each other, the top and bottom edges of the spring unit extend within said channel elements when the angular portion of the spring unit is deflected downwardly and released to have the top and bottom edges thereof enter the facing channel elements at the top and bottom edges of the fascia members which are supported thereby.

4,071,988

CORE AND BEAM SUSPENSION SYSTEM FOR A BUILDING CONSTRUCTION AND METHOD OF CONSTRUCTION

Peter Bowes, 1700 Civic Center Drive, No. 601, Santa Clara, Calif. 95051

Filed Mar. 29, 1974, Ser. No. 456,004
Int. Cl.[2] E04B *1/34, 1/35*
U.S. Cl. 52—127 **4 Claims**



1. A suspension system for a building construction of the kind in which floors are suspended from a central support, said system comprising,

at least one core support means formed with a plurality of vertically spaced openings for individual floor support beam means,

floor lifting means for lifting each floor from a ground level build-up to the desired height on the core support means, and

floor support beam means associated with related openings in the core support means for supporting a floor directly from the core support means and independently of all the other floors after the floor has been lifted to the desired height, and

wherein the floor lifting means include at least one jack rod support beam on top of the core support means, a plurality of jack rods connected down from the jack rod support beam and lifting jacks associated with the jack rods and connectable to the top of the floor to be raised, and

wherein the core support means include a hollow concrete tower formed by slip forming and having laterally spaced sidewalls with horizontally aligned openings in each sidewall, and

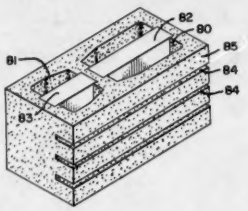
wherein the floor support beam means include a plurality of support beams each longer than the width between the tower side walls and including conveyor beam means for lifting each support beam to a position in alignment with a pair of horizontally aligned openings in the sidewalls and operable to permit the support beam to be pulled from the conveyor beam means and inserted through the aligned openings with outwardly projecting ends for supporting the floor above the installed support beam.

4,071,989

SOUND INSULATIVE MASONRY BLOCK

Millard R. Warren, Knoxville, Tenn., assignor to Warren Insulated Bloc, Inc., Knoxville, Tenn.

Filed Jan. 19, 1976, Ser. No. 650,029
Int. Cl.[2] E04B *1/82*
U.S. Cl. 52—145 **4 Claims**



1. An acoustic construction block comprising:

pairs of opposed side masonry walls and opposed end web walls of masonry forming a cavity therebetween;

an intermediate web wall of masonry disposed parallel to said end web walls and located closer to one end web than the other to divide said cavity into-side-by-side cavity portions of unequal volume;

each cavity portion being bounded at front and rear sides by one of said side walls, with the dimension of each cavity portion from one side wall to the other being substantially equal;

one of said side walls containing apertures extending completely therethrough and opening into said cavity portions so as to transmit sound waves into said cavity portions;

each end wall including an upright channel in its inner surface and said web wall comprising upright channels on both sides thereof; said channels being situated approximately midway between said side walls; and

a first panel of sound insulative material disposed within a larger of said cavity portions, the ends of said first panel being uprightly arranged in said channel of one end wall and one channel of said web wall;

each panel disposed parallel to said side walls and spaced from both of said side walls to form damping chambers on opposite sides of each panel;

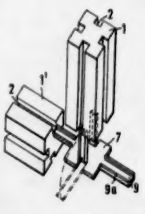
said panels being operable to absorb sound waves and conduct sound waves from one damping chamber to the other.

4,071,990

DEMOUNTABLE FRAME AND PANEL

Fritz Traber, Oberviechtacher Str. 29, 8000 Munich 90, Germany

Filed Jan. 26, 1976, Ser. No. 652,595
Claims priority, application Germany, Jan. 29, 1975, 2503669; Jan. 29, 1975, 2503643
Int. Cl.[2] F16B *7/04*
U.S. Cl. 52—155 **11 Claims**



1. A device for providing erectable and demountable, wall-like structures, using a

mountable and removable arresting device for a foil or a similar thin covering material for making temporary or permanent coverings, encasings, spatial partitions, and the like, comprising:

a plurality of self-supporting, elongated, longitudinally-extending clamping bars, each having a generally rectangular cross-section and having defined therein at least one, open-ended groove, extending in a direction of a longitudinal axis thereof and having ends, said grooves have a generally dove-tailed cross-section which widens in the direction toward the interior of said clamping bar;

a foil of thin covering material;

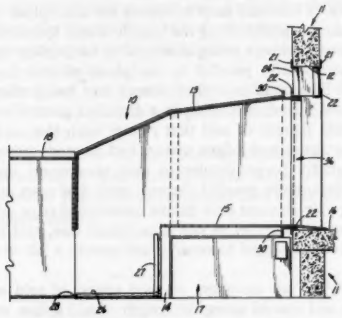
an arresting device including an elastic band over which an end of said foil may be wrapped and which is pressed into said at least one groove of said clamping bars for connecting said foil with said clamping bars, said elastic band being pressed into said groove in a transverse direction to its longitudinal axis, but parallel thereto for holding said foil in tight engagement with said clamping bars; and at least one connection clamping element, including a generally rectangular base plate and at least two self-retaining, elongated strips having bent, lateral edges extending from and connected to said base plate, which are inserted into the ends of said at least one groove for frictional engagement therewith and for connecting said plurality of clamping bars sesurely together, said strips being receivable within said groove generally below said band also received in said groove.

4,071,991

SLIP JOINT FOR DISPOSAL CHUTE

Jeffrey A. Hulligan, North Olmsted, Ohio, assignor to J. P. Suggins Mobile Welding, Cleveland, Ohio

Filed Mar. 28, 1977, Ser. No. 781,638
Int. Cl.[2] B65D *91/00*
U.S. Cl. 52—204 **9 Claims**



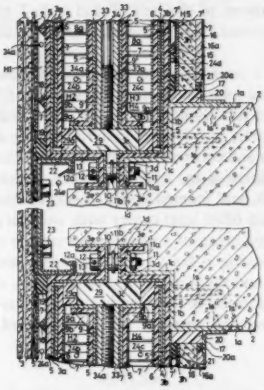
1. In a system for collection of waste materials including a container having a truck engaging means for removing, replacing and emptying the container, said container having an opening, a building having an opening, a chute, and support means for said chute positioned in spaced relation to said building, said building and said support supporting said chute in such a way as to allow slight axial movement of said chute during removal and replacement of said container, an improvement comprising said chute having a first open end, said opening of said container connected to said first open end of said chute, said chute having a second open end substantially smaller than said building opening, said second open end of said chute and said building opening arranged in spaced apart relationship, and seal means enclosing said building opening to said second open end of said chute, said seal means having slip joint means allowing said axial relative movement between said chute and said building opening.

4,071,992

CONSTRUCTION UNIT

Otto Alfred Becker, Robert Koch-Str. 59, D 6600 Saarbrucken, Germany

Filed June 30, 1976, Ser. No. 701,180
Claims priority, application Germany, July 1, 1975, 2529173; Nov. 24, 1975, 2552586; Dec. 31, 1975, 2559342
Int. Cl.[2] E04C *2/36*
U.S. Cl. 52—223 R **26 Claims**



1. A construction unit comprising

(a) outer shell members defining therebetween a cavity,

(b) a support core disposed in said cavity and adapted to subject said shells to tensile stress within the planes of said shells, said support core comprising:

(1) tubular support elements positioned interiorly of said support core and extending parallel to said shells,

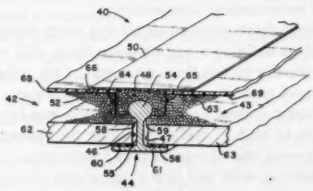
(2) means disposed within and operatively connected to said tubular support elements, said means being adjustable to place said tubular support elements under substantial tensile stress, said stress being transferred to said outer shells through said support core thereby to prestress said shells in the planes thereof.

4,071,993

CONSTRUCTION MATERIAL IN SHEET FORM AND METHOD OF JOINING SHEETS EDGE-TO-EDGE

Sherman A. Stewart, Palos Verdes Peninsula, Calif., and Estel Ray Snyder, La Grange, Ill., assignors to Grefco, Inc., Bala Cynwyd, Pa.

Filed July 6, 1976, Ser. No. 702,966
Int. Cl.[2] E04C *2/10*; E04B *7/00*
U.S. Cl. 52—309.5 **8 Claims**



1. A method of joining and spacing preformed sheets of a construction material each of said sheets having a water-impermeable intermediate foamed layer, a mineral-based interior-facing layer, and a water-impermeable exterior-facing layer, and said sheets also having mitered edges for forming a joint cavity when abutted, each of said mitered edges having an unmitered face and a first mitered face both perpendicular to the plane of said sheets and a second mitered face parallel to

the plane of said sheets, said second mitered face connecting said unmitered face with said first mitered face, said foamed layer being exposed for bonding at said first and second mitered faces, said method comprising the steps of:

a. positioning said sheets with said mitered edges abutting on opposite sides of the stem and bulb of a bulb-T rafter, said sheets being supported by the cross-member of said bulb-T rafter, the corners formed by the intersection of said unmitered and said second mitered faces contacting the lower surfaces of the ball of said bulb-T rafter to space said unmitered faces a predetermined distance from the stem;

b. forming a resilient water-impermeable foamed resinous filler in said joint cavity, said foamed filler filling said joint cavity and substantially capturing the bulb portion of said bulb-T rafter, said foamed material having at least a 30% expansion and contraction capacity, said foamed filler also firmly adhering to, and forming a water-impermeable bond with, said foamed layers of said abutted sheets; and

c. sealing said filled joint cavity with weatherable tape, said sealing tape being of a water-impermeable resilient material and having at least a 30% expansion and contraction capacity, and said tape firmly adhering to, and forming a water-impermeable bond with, said exterior-facing layers of said abutted sheets and with said foamed filler.

4,071,994

EXPANSION JOINT FOR ROOFS AND THE LIKE

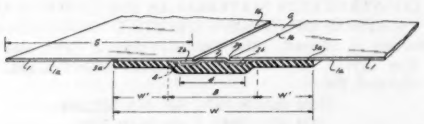
Ernst Ammann, Baltenswilerstr. 127, CH-Wallenwil, Switzerland (CH-8360)

Filed July 9, 1976, Ser. No. 704,099

Claims priority, application Switzerland, July 10, 1975, 9057/75

Int. Cl.² E04B *1/62, 1/68*

U.S. Cl. 52—573 **8 Claims**



1. An expansion joint for structures adapted to be exposed to the ambient environment, comprising:

a pair of first sheet-metal strips having confronting longitudinal edges defining a gap between them, said strips having outwardly turned faces on a side of the joint exposed to the environment and inwardly turned faces;

an elastomeric sealing band spanning said gap bonded continuously to both of said strips along the inwardly turned faces thereof and alongside said longitudinal edges, said band forming with said first strips a water-tight seal; and

a second sheet-metal strip bridging said gap and retained by said band against said first strips with freedom of sliding movement between said second strip and said first strips along said longitudinal edges and covering said band along said side of said joint, thereby shielding said band from the environment, said sealing band being vulcanized to said first strips along regions spaced from but parallel to said longitudinal edges, said second strip overlapping each of said first strips along said longitudinal edges.

4,071,995

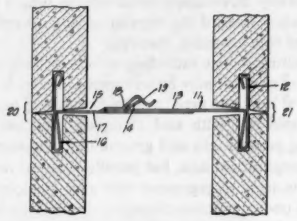
WALL CONSTRUCTION MEMBER

Melville E. Farmer, 2551 Crestview Drive, Newport Beach, Calif. 92660

Continuation of Ser. No. 296,126, Oct. 10, 1972, abandoned. This application Mar. 21, 1974, Ser. No. 453,496

Int. Cl.² E04C *3/32*

U.S. Cl. 52—729 **6 Claims**



1. A wall construction member comprising:

a first generally T-shaped runner having a spline and first and second flanges extending outwardly from the plane of said spline from one end of said spline in opposite directions therefrom;

a second generally T-shaped runner having a spline and first and second flanges extending outwardly from the plane of said spline from one end of said spline in opposite directions therefrom; and

a clip means for securing said spline of said first runner to said spline of said second runner such that said runners are capable of being readily assembled in the vertical assembly direction and also in the horizontal assembly direction, and capable of being readily disassembled in the vertical disassembly direction, and prevented from being readily disassembled in the horizontal disassembly direction,

and wherein said clip means comprises:

a plurality of resilient snap members on said spline of said first runner, spaced along the length of said spline, each of said snap members being attached to said spline along a line substantially parallel to the plane of said first and second flanges of said first runner and being displaced from said spline, extending in a direction generally away from said flanges of said first runner such that said snap member has three edges unattached to said spline, two substantially perpendicular to said attachment line and one substantially parallel thereto, with said snap member having a lip element near its one unattached edge which is substantially parallel to said attachment line, said lip element being adapted to receive and secure a tab member; and

a plurality of tab members on said spline of said second runner and spaced along the length of said spline, each of said tab members corresponding to a different one of said snap members and being attached to said spline along a line substantially parallel to the plane of said flanges of said second runner and being displaced from said spline, extending in a direction generally toward said flanges of said second runner such that said tab member has three edges unattached to said spline, two substantially perpendicular to said attachment line and one substantially parallel thereto, and thereby forms a projection capable of being received by each of said snap members, said projection capable of preventing said first and second runners from being readily disassembled in the horizontal disassembly direction, each of said snap members and corresponding tab members forming an interconnecting clip when said first runner and said second runner are assembled, said first and second runners capable of being readily assembled in the horizontal and vertical assembly directions, and capable of being readily disassembled in the vertical disassembly direction.

4,071,996

PROCESS FOR REINFORCING REINFORCED CONCRETE POST

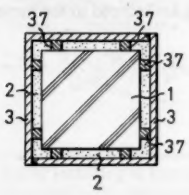
Kiyoshi Muto; Toshihiko Hisada, both of Tokyo; Nobutsugu Ohmori, Chofu; Satoshi Bessho, Tokyo; Naoharu Mori, Yokohama, and Katsuhiko Ishikawa, Tokyo, all of Japan, assignors to Kajima Kensetsu Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 501,995, Aug. 30, 1974, abandoned, which is a continuation of Ser. No. 303,199, Nov. 2, 1972, abandoned. This application Sept. 10, 1975, Ser. No. 612,225

Claims priority, application Japan, Nov. 2, 1971, 46-87488; Nov. 2, 1971, 46-87490; Oct. 6, 1972, 47-101023

Int. Cl.[2] E04H *9/02*

U.S. Cl. 52—741 **1 Claim**



1. In a pre-existing structurally sound load bearing reinforced concrete post, the method of maintaining the load bearing capacity of said post with bands during earthquake tremors, comprising the steps of:

(a) providing a plurality of band segments,

(b) bonding spacers to said band segments,

(c) securing said segments around said post, thus fitting the spacers to said post,

(d) fastening the segments together, thus completely forming said bands,

(e) vertically spacing apart said bands one from the other along the longitudinal axis of said post,

(f) interposing a hardenable bonding agent between said post and said bands, and

(g) permitting said bonding agent to harden sufficiently to convert said post, bonding agent and bands into an integral structure,

whereby decrease of load bearing capacity of said post is minimized by said bonded bands when said post is subjected to the attrition of flexing and shear due to earthquake tremors.

4,071,997

MECHANISM AND METHOD OF MAKING AN ENVELOPE

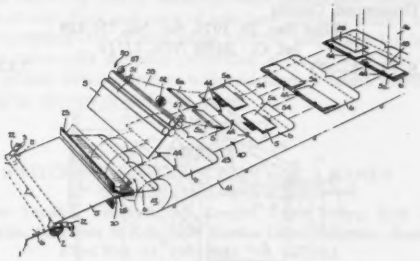
William H. Gunther, Jr., Guilford; Roman M. Golicz, Clinton, and James W. Hough, Madison, all of Conn., assignors to Gunther Business Systems, Inc., Essex, Conn.

Filed Apr. 27, 1976, Ser. No. 680,788

Int. Cl.[2] B65B *11/48*

U.S. Cl. 53—31 **41 Claims**

29. A method for forming an envelope from a composite sheet which includes an envelope assembly and a letter insert assembly connected together in lengthwise relationship to each other comprising moving said composite sheet in a lengthwise direction, severing said composite sheet widthwise between said letter assembly and said envelope assembly to separate the two assemblies, moving the envelope assembly along one path and moving the letter assembly along another path, positioning the insert assembly in superimposed relationship to the envelope assembly, causing the insert assembly to be deposited on said moving envelope assembly, folding the



envelope assembly around the insert assembly and sealing the edges of the envelope assembly.

4,071,998

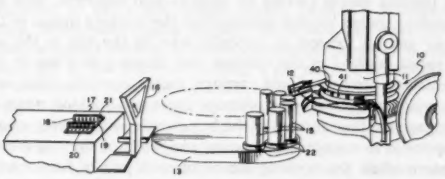
APPARATUS FOR CONTROLLING DISPENSING OF ARTICLES

Floyd G. Meadows, Rte. 2, Box 199A, Mena, Ark. 71953

Filed Nov. 29, 1976, Ser. No. 745,771

Int. Cl.[2] B65B *57/20*

U.S. Cl. 53—59 R **13 Claims**



1. A system for dispensing a plurality of articles into a plurality of containers comprising, in combination:

a dispensing apparatus including a delivery chute and a rotating member from which a plurality of articles are dispensed in sequence into said delivery chute;

a rotary table adapted to support a plurality of article containers for selective movement pass said delivery chute so that dispensed articles may fall from said delivery chute into said containers;

a movable gate for selectively interrupting the flow of articles from said delivery chute;

means for rotating said rotary table;

count means for counting the number of articles dispensed by said dispensing apparatus in response to the rotational position of said rotating member to provide an electrical control signal when the count of articles dispensed reaches a predetermined number;

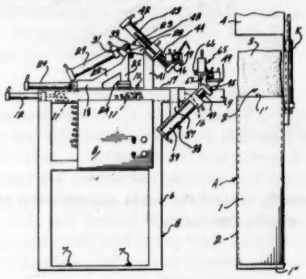
means responsive to said electrical control signal to cause said gate to close to interrupt the flow of articles from said delivery chute, and to cause said means for rotating said rotary table to be actuated, and

means responsive to the rotational position of said rotary table to stop the rotation thereof when a container is in position to receive articles from said chute, and to cause said gate to open to permit dispensed articles to fall into said container.

4,071,999
MACHINE FOR BAG CLOSING AND SEALING

Jean-Yves Nolet, 70 Dubois Street - R.R. 2, St. Nicephore, Drummond, Canada

Filed Dec. 29, 1976, Ser. No. 755,429
Int. Cl.[2] B65B 7/06, 51/14
U.S. Cl. 53—373 7 Claims



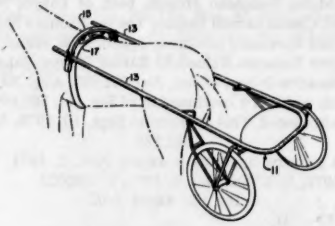
1. A machine for closing the open mouth of a bag filled with material and supported in an upright position at a bag-closing station, with the walls of the bag mouth extending upwardly from the material filling the bag and defining two opposite end walls and two opposite side walls, said machine comprising a carriage movable in a substantially horizontal path towards and away from the bag-closing station between an advanced and a retracted position, respectively, and including two spaced substantially parallel supports positioned on opposite sides of an upstanding bag at said bag-closing station in the advanced position of said carriage, a pair of hooking means and a pushing means carried by each of said supports, with the pushing means located intermediate the hooking means of the pair and all located on opposite sides of the bag in the advanced position of the carriage and clearing said bag in the retracted position of said carriage, means operable when said carriage is in advanced position to cause said hooking means to engage the four corners of the bag mouth, said pushing means operable to engage the opposite end walls of the bag mouth intermediate the hooking means of each pair to form center folding of said end walls, and means to move the hooking means of each pair downwardly along converging inclined paths in a vertical plane substantially parallel to the associated end wall of the bag mouth to thus lower said hooking means and simultaneously approach the same towards the respective pushing means to allow said side walls to overlie the material filling the bag and to bring said side walls together in bag-closing position while allowing said pushing means to lengthen said center folds as said side walls approach each other.

4,072,000
HARNESS RACING HITCH

John E. Clemens, 1460 U.S. 35 East, Xenia, Ohio 45385

Filed Jan. 13, 1976, Ser. No. 648,719
Int. Cl.[2] B68B 1/00
U.S. Cl. 54—2 2 Claims

1. In a hitch for a racing sulky having a single transverse axle and two forwardly extending shafts for connection to the horse wherein the driver is situated behind the axle, whereby the shafts exert an upward force on the horse, a harness saddle adapted to be positioned on the back of and secured about the body of the horse, a rigid U-shaped yoke overlaying said saddle, said yoke being rigidly connected to both shafts adjacent the ends thereof, and pivotal means for connecting the underside portion of the apex of said yoke to the top of said saddle,

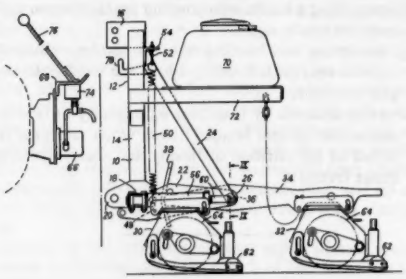


whereby the shafts are secured to the horse only through said yoke.

4,072,001
MOWING MACHINES

Edward John Aldred, Ipswich, England, assignor to Ransomes Sims & Jefferies Limited, England

Filed July 20, 1976, Ser. No. 707,095
Claims priority, application United Kingdom, July 28, 1975, 31513/75
Int. Cl.[2] A01D 75/30
U.S. Cl. 56—7 13 Claims

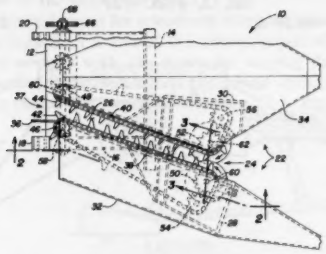


1. A mowing machine comprising a frame adapted to be mounted on a tractor three-point linkage, and a plurality of cutting units connected to said frame, so that in use said cutting units are lifted to a transport position as said frame is raised by the tractor three-point linkage, including at least two laterally spaced side cutting units and a center cutting unit positioned so as, in use, to cut a swath between two swaths cut by said side cutting units, said side cutting units being mounted directly on said frame, so that in use part of the weight of said frame is supported by said side cutting units, and wherein said center cutting unit is mounted on an end of a mounting arm connected to said frame and pivotal at least about a horizontal axis transverse to the direction of travel of the machine, and wherein resilient biassing means are connected between said frame and said mounting arm for increasing the pressure exerted on the ground in use by the center cutting unit and for decreasing the pressure exerted on the ground in use by said side cutting units.

4,072,002
ROTARY SEVERING MECHANISM FOR A ROW CROP HEADER

Larry E. Heller, New Holland; Joe E. Shriver, East Earl, and Curtis H. Lindblom, New Holland, all of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Aug. 11, 1976, Ser. No. 713,469
Int. Cl.[2] A01D 45/02
U.S. Cl. 56—53 4 Claims

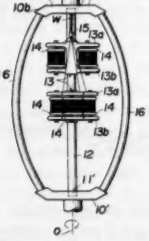


1. An improved rotary severing mechanism for a harvesting machine row crop header including at least one row crop unit having at least one elongated crop passageway for receiving a row of crop, said improved severing mechanism comprising:
(a) first and second rotatably driven shafts disposed on opposite sides of said elongated passageway,
(b) first and second severing elements respectively supported on said first and second shafts, said first and second severing elements extending outwardly from said respective shafts into said passageway to define a severing zone and being operable to sever crop within said severing zone upon predetermined counter-rotation of said shafts,
(c) said first and second severing elements comprising discs having confronting shearing surfaces defined by beveled edge portions disposed for cooperative engagement in said severing zone to sever said crop under conditions where said first and second shafts are counter-rotated, and
(d) a flat guide element supported on said first shaft below said first and second element, coaxial with said first element and overlapping with said second severing element for promoting orientation of said crop within said severing zone.

4,072,003
DOUBLE TWISTING MACHINE OF FLYER TYPE

Kazuhiko Mino, Iwakuni, Japan, assignor to Teijin Seiki Company Limited, Osaka, Japan

Filed Feb. 1, 1977, Ser. No. 764,733
Claims priority, application Japan, July 19, 1976, 51-95971
Int. Cl.[2] D01H 7/86, 7/24
U.S. Cl. 57—58.52 5 Claims

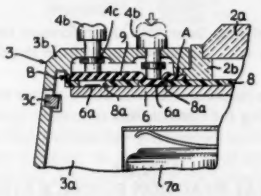


1. A double twisting machine comprising a pair of rotatable fliers, a pair of bow guides formed with a through bore for allowing wire elements to pass therethrough, two pair of guide holders each retained in one end of each of said fliers for holding one end of each of said bow guides, and two pair of shock-absorbing elastic members each interposed between each of said fliers and each of said bow guides through the corresponding one of said guide holders, said guide holders being universally movably connected at an extreme end of each of said elastic members with said fliers to assure smooth swinging motions of said bow guides.

4,072,004
SWITCHING CONSTRUCTION FOR A HANDY ELECTRONIC DEVICE

Kojiro Tanaka, Yachiyo, and Kenjiro Yagi, Tokyo, both of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Feb. 11, 1976, Ser. No. 657,312
Claims priority, application Japan, Feb. 14, 1975, 50-19230
Int. Cl.[2] G04C 3/00
U.S. Cl. 58—23 R 4 Claims



1. In an electronic timepiece of the type having a digital display device, and electronic circuitry including a printed circuit board having a pattern of printed conductors thereon connected to drive said digital display device: a timepiece casing having said digital display device and electronic circuitry mounted therein; a cover member disposed atop and connected to said timepiece casing; a plurality of depressable key switches mounted on a portion of said cover member at a location overlying and spaced from said pattern of printed conductors; and means coacting with said cover member for both sealing in a water proof manner the region between the cover member interior and the timepiece casing interior and effecting electrical connection between individual ones of said key switches and said pattern of printed conductors when said key switches are depressed.

4,072,005
CLOCK DEVICE

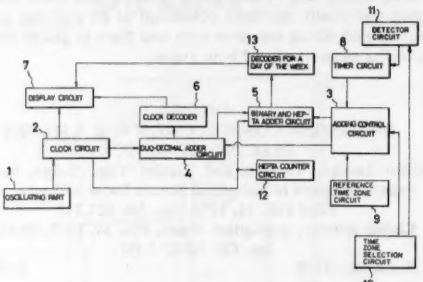
Toru Teshima, Hatano; Takuhisa Ehara, Tokyo, and Kaname Nakanishi, Hatano, all of Japan, assignors to Stanley Electric Co., Ltd., Japan

Filed Jan. 16, 1976, Ser. No. 649,856
Claims priority, application Japan, June 27, 1975, 50-79791
Int. Cl.[2] G04B 19/22; G04C 3/00
U.S. Cl. 58—42.5 4 Claims

1. A clock device comprising:
clock means for generating clock signals representative of time;
means for selecting a selected time zone;
a time zone selection circuit for providing signals representative of the selected time zone;
a reference time zone circuit for providing signals representative of a reference time zone;
detector means for detecting the selecting of a time zone and for producing an output signal in response thereto;
timer means responsive to the output signal from the detector means for producing an output signal pulse of a predetermined duration;
control means responsive to the output signal from the timer means for selecting between the signals from the time zone

selection circuit and the signals from the reference time zone circuit;

adder means for adding the clock signals and the signals selected by the control means selectively to selectively produce output signals representative of correct time in



the selected time zone and the reference time zone, in accordance with the output signal from the timer means; and

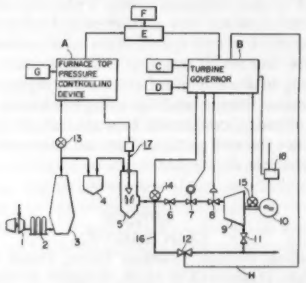
display means responsive to said adder means output signal for displaying the correct time.

4,072,006

CHEMICAL REACTION FURNACE SYSTEM

Masanobu Inubushi; Hajime Yamamoto, and Osamu Nagata, all of Kobe, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed July 16, 1976, Ser. No. 706,108
Claims priority, application Japan, July 19, 1975, 50-88559
Int. Cl.[2] F02C *9/02;* F02G *3/00*
U.S. Cl. 60—39.25 **6 Claims**



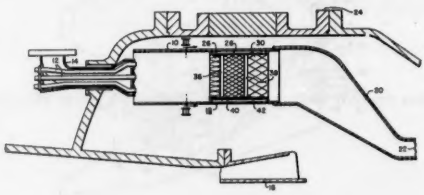
1. A chemical reaction furnace apparatus having a reaction furnace (3), a reaction gas main flowpath for conducting reaction gas away from the top of the reaction furnace, and a reaction gas scrubbing device (5) installed in said main flowpath and being adapted to control the presence of the reaction gas in the top of the reaction furnace, said apparatus comprising: an expansion turbine (9) provided in the gas main flowpath downstream from said scrubbing device (5) and being operable to utilize energy in the reaction gas; a gas bypass flowpath (16) branched from said main flowpath at a point between said scrubbing device (5) and said turbine (9) and bypassing the turbine; a bypass valve (12) disposed in said bypass flowpath; a turbine inlet pressure detector (14) for detecting inlet gas pressure of the turbine; a turbine speed regulating valve (8) installed in said main flowpath between said detector (14) and said turbine (9); and a turbine governor (B) receiving a signal from said detector (14) to control said turbine speed regulating valve (8) for maintaining the inlet gas pressure of the turbine at the highest possible value at which the scrubbing performance of said scrubbing device (5) can be maintained.

4,072,007

GAS TURBINE COMBUSTOR EMPLOYING PLURAL CATALYTIC STAGES

Santiago C. Sanday, Swarthmore, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 3, 1976, Ser. No. 663,338
Int. Cl.[2] F02C *7/22*
U.S. Cl. 60—39.69 A **5 Claims**



1. In a gas turbine including a combustor of the catalytic reactor type having a shell containing catalytic element means intermediate the upstream part of the shell to which combustion air and fuel is admitted, and the downstream part of the shell which joins a transition section to pass combustion gas to the turbine, wherein the improvement lies in:

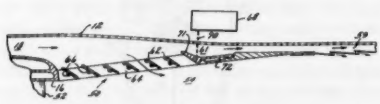
the catalytic element means comprising at least two cross-flow honeycomb type structures having a multiplicity of catalyst coated flow passages, one series of flow passages extending in crossing relation to another alternating series of flow passages, and both series of flow passages extending in oblique relation to the longitudinal axis of said shell, so that the combustion gas from different radial locations in a cross section upstream from said catalytic element means is shifted to other radial locations in passing downstream, to promote temperature uniformity of the gas in a radial direction throughout the cross section of the combustor, successive ones of said cross-flow catalytic element means are provided in axially-spaced relation in said shell, with the transverse cross section of the shell between said successive ones being unobstructed in the sense of accommodating axial flow throughout a cross sectional area at least equal to the cross sectional area of said catalytic element means, and being devoid of means for transferring heat out of said shell.

4,072,008

VARIABLE AREA BYPASS INJECTOR SYSTEM

Milton James Kenworthy, Cincinnati, and Ivan Elmer Woltmann, West Chester, both of Ohio, assignors to General Electric Company, Lynn, Mass.

Filed May 4, 1976, Ser. No. 682,951
Int. Cl.[2] F02K *3/08, 3/06;* F02C *3/06*
U.S. Cl. 60—261 **11 Claims**



1. An improved gas turbine engine of the type having an inlet for supplying a gas flow to a core engine, duct means for bypassing a portion of the inlet gas flow around the core engine, a mixer for injecting the bypass stream into the core engine exhaust stream, an augmentor for receiving the mixed streams and directing them to an exhaust nozzle and an annular

passage circumscribing the augmentor to provide cooling flow thereto wherein the improvement comprises:

a Variable Area Bypass Injector (VABI) including means for varying the cross-sectional area through which the bypass stream is injected into the core engine exhaust stream whereby the static pressure of the bypass stream may be matched to the static pressure of the core engine exhaust stream prior to mixing the two streams and further including means for selectively obtruding cooling flow to the augmentor, and

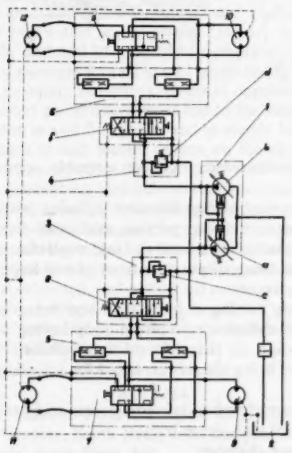
wherein said means for selectively obtruding cooling flow to the augmentor is formed as a structural part of, and moves concurrently with, the means for varying the cross-sectional area through which the bypass stream is injected into the core engine exhaust stream.

4,072,009

PRESSURE SYSTEM FOR DRIVING THE WHEELS OF A VEHICLE

Stefan Daschievici, and Cezar Ferat, both of Braila, Romania, assignors to Institutul de Cercetari si Proiectari Pentru Utilaje de Constructii de Drumuri(I.C.P.U.C.) Braila, Braila, Romania

Filed Oct. 21, 1976, Ser. No. 734,597
Int. Cl.[2] F15B *13/06, 13/09*
U.S. Cl. 60—484 **2 Claims**



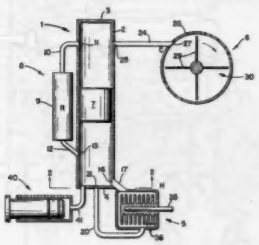
1. Apparatus for driving wheels of a vehicle in which the wheels are arranged in pairs on opposite sides of the vehicle, said apparatus comprising a duplex pump assembly including two pumps connected in parallel, a hydraulic supply, said pumps being connected to said supply, and means connecting each pump in open circuit relation with a respective pair of wheel driving motors, said means comprising distributors connected in series to respective pumps, a pair of flow dividers connected in series to respective distributors, and switch control means connected to respective pairs of flow dividers and to respective wheel driving motors of the associated wheel pair for selectively feeding pressure fluid to said driving motors for selecting one of two distinct travel speeds of the vehicle, one corresponding to drive of all four wheel motors, the other corresponding to drive of the two wheel motors of the rear wheels, the front wheel motors then being connected in short circuit to said supply.

4,072,010

THERMALLY DRIVEN PISTON APPARATUS

Mark Schuman, 101 G St., SW. Apt. 516, Washington, D.C. 20024

Continuation of Ser. No. 592,895, July 3, 1975, Pat. No. 4,012,910. This application Nov. 10, 1976, Ser. No. 740,486
Int. Cl.[2] F02G *1/04*
U.S. Cl. 60—520 **42 Claims**



1. An energy converter comprising:

a cylinder fitted with a free piston sized to form a sliding seal with the cylinder as the piston oscillates between and separates hot and cold ends of the cylinder;

a cylinder bypass bypassing a portion of the cylinder so as to allow a compressible fluid to alternately flow back and forth between said hot and cold ends of the cylinder as the piston coasts in alternate directions between said cylinder ends;

means for cooling the fluid flowing into the cold cylinder end and for heating the fluid flowing into the hot cylinder end thereby producing a cyclical fluid pressure variation utilizable for driving a load;

said heating means including a heating chamber disposed outside of the bypass and communicating with the hot end of the cylinder via a heating chamber inlet conduit, said inlet conduit communicating with the hot end of the cylinder via a heating chamber inlet port defined in the hot end of the cylinder;

said bypass including, in seriatim, a cold bypass port defined in said cold end of the cylinder, a hot bypass conduit, and a hot bypass port defined in the sidewall of the cylinder in said hot end of the cylinder, whereby the fluid exiting the hot end of the bypass via said hot bypass port flows into the hot end of the cylinder in a substantially defined stream during a first coasting portion of the oscillatory cycle while the piston is coasting in the bypass region of the cylinder toward the cold end of the cylinder;

means for positioning and aligning said hot bypass conduit and said heating chamber inlet port with respect to each other and with respect to the hot end of the cylinder so as to augment passage of said fluid in said stream into said heating chamber via said inlet port and said inlet conduit for heating fluid in the heating chamber during said first coasting portion of the cycle;

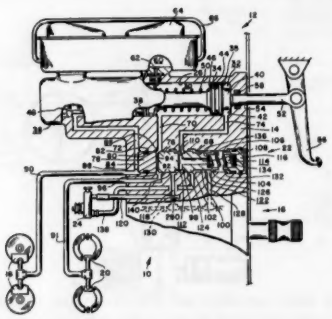
said piston during a hot rebound portion of the oscillatory cycle blocking said hot bypass port and compressing and forcing fluid from the hot end of the cylinder into said heating chamber for heating therein for expanding and driving said piston toward the cold cylinder end with a greater piston kinetic energy at the end of the hot rebound cycle portion than the kinetic energy of the piston at the beginning of the hot rebound cycle portion; and

means for reversing the piston motion at the cold cylinder end.

4,072,011
HYDRAULIC BRAKE BOOSTER

Jerome T. Ewald, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Filed Mar. 24, 1976, Ser. No. 670,513
Int. Cl.[2] B60T 13/20
U.S. Cl. 60—555 9 Claims



1. A combined wheel brake actuator and power steering mechanism for a vehicle comprising:

a housing having a first bore, a second bore and a third bore located therein;

a first piston located in said first bore for establishing a first pressurizing chamber and a power chamber therein;

a second piston located in said first bore for establishing a second pressurizing chamber therein;

a first plunger located in said second bore for establishing a first flow through chamber, a distribution chamber and a control chamber, said first flow through chamber being connected to said first pressurizing chamber by a first passage and to a first outlet port, said first outlet port being connected by a first conduit to a first set of wheel brakes on the vehicle, said distribution chamber being connected to said power chamber by a distribution passage and to a reservoir by a relief conduit, said control chamber being connected by a first supply conduit to receive the fluid output of a pump and to said third bore through a second supply conduit;

a second plunger located in said second bore for establishing a second flow through chamber therein, said second flow through chamber being connected to said second pressurizing chamber by a second passage and to a second outlet port, said second outlet port being connected by a second conduit to a second set of wheel brakes on the vehicle;

resilient means located in said second bore for urging said first plunger into engagement with said second plunger to permit the fluid output of the pump to freely flow through said control chamber;

a rotary valve located in said third bore for controlling the communication of the fluid output of the pump in said second supply conduit to a steering gear in response to an operator steering input to aid in turning the wheels of the vehicle, said third bore being connected to said relief conduit by a relief passage to permit the fluid output in the third bore to be returned to the reservoir of the pump;

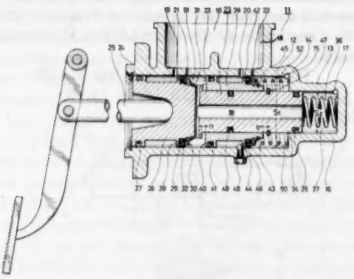
actuator means responsive to an operator brake input force for moving said first piston to create a first fluid actuation pressure in said first pressurizing chamber, said first fluid actuation pressure being communicated through said first passage, said first flow through chamber, said first outlet port, and said first conduit to initiate operation of said first set of wheel brakes, said first fluid actuation pressure in said first flow through chamber moving said first plunger in opposition to said resilient means to interrupt communication between said distribution chamber and said relief passage and thereafter restrict the flow of the fluid output of the pump through the control chamber and proportionally allow a portion of the fluid output of the pump in the control chamber to flow into said distribution chamber for communication to said power chamber, said portion of the fluid output of the pump in the power chamber acting on said first piston to provide an auxiliary input force for moving said first piston in the first pressurizing chamber to create an operational brake fluid pressure; and

stop means located in said second bore for limiting the movement of said first plunger and correspondingly that portion of the fluid output of the pump diverted from said control chamber to assure that minimal fluid output from the pump is continually available to operate said steering gear.

4,072,012
DUAL-SYSTEM MASTER CYLINDER

Susumu Kawakami, Toyodashi, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Sept. 13, 1976, Ser. No. 722,504
Claims priority, application Japan, Oct. 3, 1975, 50-119485; Oct. 3, 1975, 50-119486
Int. Cl.[2] B60T 11/20
U.S. Cl. 60—562 7 Claims



1. A dual-system master cylinder assembly comprising, in combination:

a cylinder having a large-diameter cylinder portion and a small-diameter cylinder portion, said small-diameter cylinder portion having a head and said small-diameter cylinder portion being disposed in front of said large-diameter cylinder portion;

a piston body having a front face and being positioned within said cylinder, said piston body having a diameter corresponding to that of said small-diameter cylinder portion and being slidably arranged for actuating pressure therein;

a front pressure chamber defined between said head and said front face of said piston body;

a rear pressure chamber;

said piston body having means thereon for cooperating with a first compensation port to control communication between a fluid reservoir and one of said front and rear pressure chambers;

a large piston slidably mounted around said piston body so as to be relatively movable thereon, said large piston having a front surface and a rear surface and means on said large piston adjacent said front surface for cooperating with a second compensation port to control communication between said fluid reservoir and a brake fluid operating chamber defined between said large-diameter cylinder portion, piston body, large piston front surface and a land between said large-diameter cylinder portion and small-diameter cylinder portion, said piston body including a bore extending axially therethrough providing continuous fluid communication from said front pressure chamber, defined between said head and said front face of said piston body, to said rear pressure chamber, said rear pres-

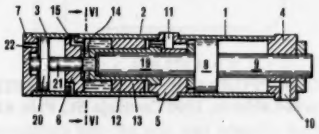
sure chamber being defined by the wall of said large-diameter cylinder portion, surface of said piston body and said rear surface of said large piston.

4,072,013

FLUID PRESSURE ACTUATED OPERATOR CYLINDER WITH INCORPORATED STRESS CONVERTER

Aldo Barbareschi, Via Portofino 15, Turin, Italy

Filed Oct. 1, 1975, Ser. No. 618,372
Claims priority, application Italy, Oct. 10, 1974, 70022/74
Int. Cl.[2] B60T *13/58*
U.S. Cl. 60—563 **6 Claims**



1. An operator cylinder comprising a casing, said casing comprising three adjacent and successive coaxial sections, two end heads at opposite ends of said casing, two intermediate walls separating said sections, a first pneumatic piston movable in a cylinder comprised by said first section, said first piston having a piston rod comprising an operator stem thereon that extends through and beyond the adjacent said end head, said first piston having a hydraulic plunger thereon that extends into said second section, an annular idle hydro-pneumatic piston that slides within a cylinder comprised by said second section, said annular piston sealingly surrounding a hydraulic cylinder within said second section, said hydraulic plunger sealingly sliding within said hydraulic cylinder, a second pneumatic piston disposed in a cylinder comprised by said third section, feed passages formed in said heads and in said intermediate walls to supply air under pressure to opposite sides of said first and second pneumatic pistons and to the same side of said annular piston as said first piston and to supply hydraulic fluid under pressure to said second section on the opposite side of said annular piston and to the interior of said hydraulic cylinder, means establishing hydraulic communication between the interior of said hydraulic cylinder and said other side of said annular piston, means actuated by said second pneumatic piston for transmitting to said hydraulic fluid in said hydraulic cylinder a pressure higher than the air pressure to which said first piston is subjected, and cutting off means cooperating with said transmitting means in order to cut-off said communication between said hydraulic cylinder and said annular piston during operation of said transmitting means.

4,072,014

CONTROL MEANS FOR A TWO STAGE SERVOMOTOR

Delbert J. Gardner, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

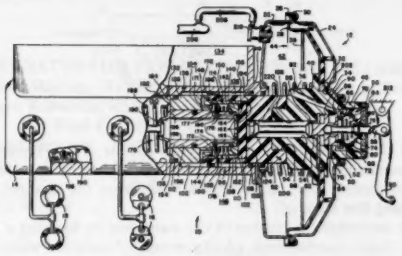
Filed Mar. 22, 1976, Ser. No. 669,133
Int. Cl.[2] B60T *11/08;* **F15B** *7/04*
U.S. Cl. 60—575 **16 Claims**

1. In a two stage servomotor for energizing the wheel brakes of a vehicle in a first stage with a fluid pressure created by moving a piston means in a pressurizing chamber of an actuator bore by a first input force and in a second stage by moving said piston means in the pressurizing chamber through a combined forced of a second input force and pressure force created by the fluid pressure acting on the piston means in an input chamber, actuation means for shifting the operation of said two stages servomotor from said first stage to said second stage, comprising:

cylindrical means associated with said piston means in said actuator bore for establishing said input chamber and a reservoir chamber, said cylindrical means having a passageway for connecting said input chamber with said pressurizing chamber and said reservoir chamber, said cylindrical means being responsive to said first and second input forces;

deformable means for transmitting said first and second input forces from the cylindrical means to said piston means, said first and second input forces and the fluid pressure in the pressurizing chamber causing said deformable means to change shape; and

valve means located in said bore and responsive to said change in shape of said deformable means for preventing fluid communication through said passageway from said pressurizing chamber to said reservoir chamber and said



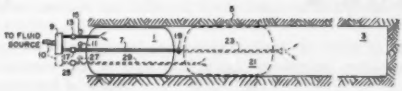
input chamber while allowing fluid to be communicated from said reservoir chamber to said input chamber in said first stage of operation and for preventing fluid communication from said reservoir chamber to said pressurizing chamber and said input chamber when said fluid pressure in the pressurizing chamber reaches a predetermined value and thereafter allows fluid communication between said pressurizing and input chambers to initiate said second stage of operation, said fluid pressure communicated to said input chamber acting on a portion of said cylindrical means which in turn abuts the piston means to aid in the movement thereof.

4,072,015

BOREHOLE AEROSTATIC GROUND SUPPORT SYSTEM

Roger J. Morrell, Bloomington; Jerome A. Gunn, and Richard J. Wilson, both of Minneapolis, all of Minn., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Dec. 30, 1976, Ser. No. 755,917
Int. Cl.[2] E21D *5/00*
U.S. Cl. 61—35 **5 Claims**



1. A method for providing temporary ground support to an underground auger mining area comprising the steps of:

(a) drilling a series of aligned auger holes into the working face of a mine;

(b) inserting an inflatable container lengthwise into each of the drilled auger holes;

(c) connecting a source of pressurized fluid to each of the containers at a specific time to cause it to expand to the borehole's size to provide a pressure tight plug therein;

(d) forcing a fluid at a predetermined pressure through each of said inflated containers to fill the borehole's cavity located more remote from the mine face; and

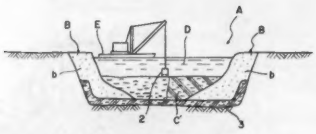
(e) sequentially deflating the boreholes supported by the pressurized fluids of steps (c) and (d) to allow the drilled auger holes to collaspe in a controlled manner.

4,072,016

METHOD OF RECONSTRUCTING AND RECLAMATION OF RIVER CHANNELS

Kiyoshi Seki, 2-15 Komitsu-cho, Ashiya, Hyogo; Ichiro Tomioka, 630-3 Kitabatake, Motoyama-cho, Higashinada, Kobe, and Yoshihiko Sawa, 6-22, 1-chome, Higashinoda-cho, Miyakojima, Osaka, all of Japan

Filed Nov. 17, 1976, Ser. No. 742,540
Int. Cl.[2] E02B *3/04, 3/00*
U.S. Cl. 61—35 8 Claims



1. A method of improving river, harbor or other waterway channels having large deposits of soft sediment in a fluidized state therein, by contouring and stablizing the channel, comprising the steps of:

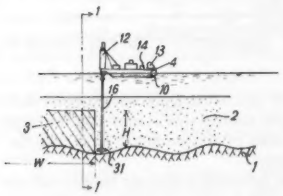
1. delineating a portion of the waterway by forming a watertight compartment (A) by means of partition walls;
2. depositing a stable fill material (b) such as sand or soil on at least two opposite sides adjacent the boundaries of said compartment causing said stable fill to mix with said fluidized sediment and to force out water from a portion of said sediment thereby causing a portion of said sediment to attain sufficient bearing strength and whereby said stable fill causes the remainder of said sediment in the bottom of said channel to be displaced from the areas adjacent the boundaries of said compartment to the midportion of said compartment in a consolidated mass (C); and said stablized material is deposited in sufficient quantity to form a stable surface (B) upon which earth machines may work in carrying out further process steps; and
3. hardening said entire remaining consolidated fluidized mass (C) into a hardened mass (C') by agitating said fluidized mass (C) and introducing a hardening agent into said fluidized mass (C) while said mass (C) and hardened mass (C') are covered by a layer of water (D).

4,072,017

TREATING SOIL

Hisashi Shiraki, 241-31 Hirotani-cho, Fuchu, Hiroshima, Japan

Continuation of Ser. No. 622,281, Oct. 10, 1975, abandoned. This application Feb. 22, 1977, Ser. No. 770,324
Claims priority, application Japan, Oct. 11, 1974, 49-117565
Int. Cl.[2] E02D *3/12*
U.S. Cl. 61—35 1 Claim



1. The method of treating a weak soil layer above a foundation layer, to form a stabilized mass based on said foundation layer and of predetermined height, width and length, which comprises the steps of:

i. agitating said weak soil layer by moving through it a plurality of rotating agitator impellers, arranged closely spaced in a row, the agitator impellers being reciprocated vertically and simultaneously translated horizontally through the weak soil layer in a direction transversely to the row, each agitator impeller being moved in its vertical movement independently of the other agitator impellers through a vertical stroke of which the lower end point is determined by contacting of the foundation layer by the respective agitator impeller, and of which the upper end point is predetermined as the upper boundary of the stabilized mass and is the same for all of the agitator impellers, and

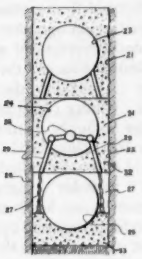
ii. injecting a solidifier agent from the rotating agitator impellers into the weak soil layer during the rotation and vertical and translatory movement of the agitator impellers.

4,072,018

TUNNEL SUPPORT STRUCTURE AND METHOD

Alberto Alvarez-Calderon, 1560 Castilleja St., Palo Alto, Calif. 94306

Filed Oct. 31, 1975, Ser. No. 627,685
Claims priority, application Sweden, Apr. 30, 1975, 7505069; France, Apr. 30, 1975, 75 13654
Int. Cl.[2] E21F *15/00, 13/00*
U.S. Cl. 61—35 22 Claims



1. A method for constructing a chamber within backfill material placed in a mining excavation comprising the steps of

a. placing space-occupying means in said excavation, with said space-occupying means having the general shape of said chamber,

b. maintaining the shape of said space-occupying means through the use of fluid pressure maintained therein,

c. placing a mixture of solids and liquids into said mining excavation around said space-occupying means, with said mixture having a structurally setting ingredient,

d. setting said mixture around said space-occupying means to thus form a chamber whose shape is defined by said space-occupying means.

4,072,019

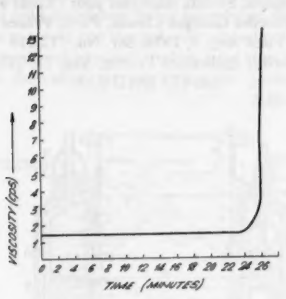
SOIL CONSOLIDATION METHOD

Leonard Louis Pearson, Slough, England, assignor to Fosroc International Limited, London, England

Continuation-in-part of Ser. No. 415,472, Nov. 13, 1973, abandoned. This application June 10, 1975, Ser. No. 585,624
Int. Cl.[2] E02D *3/14*
U.S. Cl. 61—36 C 7 Claims

1. A method of using a composition to consolidate a friable St. Peter Sandstone soil comprising providing a composition consisting essentially of an aqueous solution of an alkali metal silicate and a gelling agent therefor, the alkali metal silicate having a silica to alkali metal oxide weight ratio of from 2.3 :1 to 3.4:1, the gelling agent consisting of a tripartite blend of the mono-, di-, and tri-acetate acid esters of glycerol having a saponification value of about 590 – 670 mg KOH/g, and the composition having a viscosity of about 1 or 2 cps, applying

said composition to percolate into said soil for at least about 20 minutes, wherein the composition remains at low viscosity



while percolating into the soil, and wherein the composition then gels.

4,072,020

SOIL TREATMENT METHOD

Richard T. Bishop, Durban, South Africa, assignor to Revertex (South Africa) (Proprietary) Limited, Jacobs, South Africa

Filed Mar. 10, 1976, Ser. No. 665,566
Int. Cl.[2] E04D *3/12*
U.S. Cl. 61—36 C 1 Claim

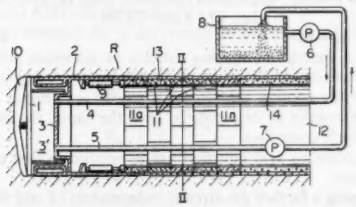
1. A method of aggregating sands to a depth of at least 3 cm to form a consolidated load-bearing crust, comprising flooding the surface of the sand with more than about 5 liters per square meter of sand, with water containing an effective amount less than about 3% by dry weight of a water-insoluble polymer emulsion selected from the group consisting of polyvinylacetate, vinylacetate-acrylic copolymer and acrylic-acrylic copolymer, which polymer has been polymerized with a colloid stabilizer as the main stabilizer in the polymer chain, said colloid stabilizer being selected from the group consisting of cellulose, polyvinyl alcohol, gum acacia and gum arabic, said amount being effective to aggregate the sand to said depth, the composition of the polymer emulsion being such that the polymer is distributed throughout the desired depth and does not migrate as the water evaporates, thereby forming bonds between adjacent sand particles.

4,072,021

METHOD OF DRIVING AND FORMING A TUNNEL WITH HYDRAULIC BORING MACHINE

Hironobu Yamazaki, Kashiwa, Japan, assignor to Tekken Construction Co. Ltd., Tokyo, Japan

Filed Nov. 2, 1976, Ser. No. 738,271
Int. Cl.[2] E01G *5/04*
U.S. Cl. 61—42 6 Claims



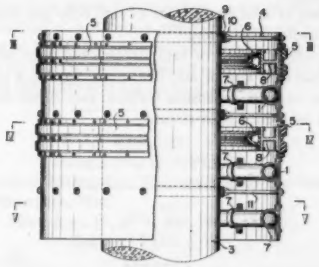
1. A tunnel driving and forming method with hydraulic boring machine through mixed ground of stable and unstable layers comprising steps of driving said machine into said ground to bore a tunnel therein, installing segments sequentially against bored tunnel wall right behind the machine as the same advances, impregnating a back-filling agent between said bored tunnel wall and outer periphery of said segments installed, removing the rearmost one of a plurality of sets of said installed segments behind the machine as long as the ground is stable, reinforcing the bored tunnel wall with respect to exposed surface of said back-filling agent impregnated and set, and repeating respective said steps responsive to advances of the machine, said step of removing the rearmost set of installed segments being suspended during an interval when an unstable layer in the ground is being bored and until next stable layer is reached so that the installed segments at the position facing said unstable layer remain for reinforcing the tunnel wall of said position.

4,072,022

APPARATUS FOR PROTECTING BRIDGE PILLARS

Soichiro Shimizu, Tokyo, Japan, assignor to Tokyo Fabric Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 12, 1976, Ser. No. 731,685
Claims priority, application Japan, Nov. 25, 1975, 50-158446[U]; Oct. 11, 1975, 50-122776
Int. Cl.[2] E02B *3/22*
U.S. Cl. 61—48 8 Claims



1. An apparatus for protecting a bridge pillar comprising a protecting cylinder adapted to be mounted outside of said bridge pillar so as to surround the latter;

a plurality of circumferentially spaced elastic connecting rods for interconnecting said bridge pillar and said protecting cylinder, said connecting rods being connected to said bridge pillar as well as to said protecting cylinder so that they may be pivoted in every direction and being extended at right angles to said bridge pillar and said protecting cylinder;

an outer cushion pad adhered to the outside of said protecting cylinder;

an inner cushion pad adhered to the inside of said protecting cylinder; and

means for floating said protecting cylinder in water in such a manner that at least half of said protecting cylinder is immersed in water.

4,072,023

AIR-RECTIFICATION PROCESS AND APPARATUS

Helmut Springmann, Geretsried, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Feb. 17, 1976, Ser. No. 658,661
Claims priority, application Germany, Oct. 3, 1975, 2544340
Int. Cl.[2] F25J *3/04*
U.S. Cl. 62—13 9 Claims

1. A method of separating air comprising the steps of:

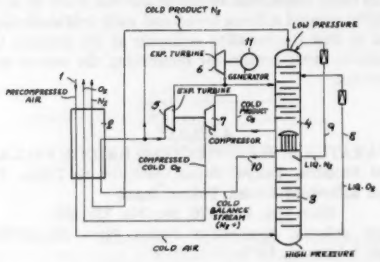
cooling precompressed and prepurified air in a main heat exchanger to produce a first cold air stream;

rectifying said first cold airstream to separate it into an oxygen-containing liquid and a nitrogen-containing liquid in a high-pressure stage of a LINDE double column, said liquids being introduced into a low-pressure stage of said

column producing a cold gas stream consisting predominantly of nitrogen and a cold gas stream consisting predominantly of oxygen;

passing said cold gas streams through said heat exchanger from the cold end thereof to the warm end thereof;

drawing a balance cold gas stream from said column between ends of said column and passing it through at least



part of said heat exchanger from said cold end of said heat exchanger;

expanding at least part of one of said cold gas streams in an expansion turbine; and

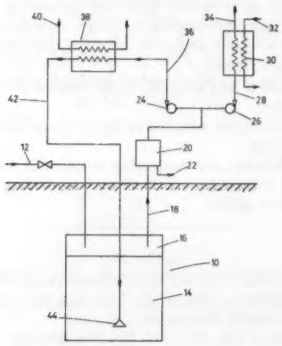
compressing another of said streams between said column and said cold end of said heat exchanger in a compressor driven by said expansion turbine, said other cold stream being said third cold stream.

4,072,024

RECOVERY OF AMMONIA FROM UNDERGROUND STORAGE

John Tyson Higgins, Trail, Canada, assignor to Cominco Ltd., Vancouver, Canada

Filed Oct. 12, 1976, Ser. No. 731,243
Int. Cl.² F17C 9/02
U.S. Cl. 62—50 **6 Claims**



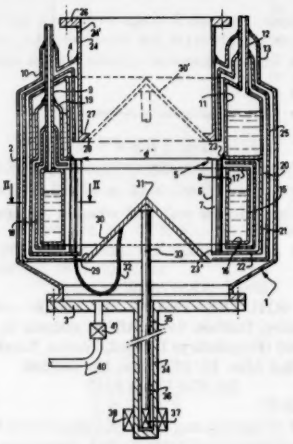
1. A process for recovering gaseous ammonia from liquefied ammonia stored in an underground cavern, comprising heating gaseous ammonia to a temperature below that at which decomposition occurs, feeding said heated gaseous ammonia into the liquefied ammonia in the cavern and releasing the heated gaseous ammonia in said liquefied ammonia to cause conversion of some of the liquid into gaseous form, and withdrawing gaseous ammonia from the cavern.

4,072,025

REGENERATION-TYPE CRYOPUMP

Jean-Jacques Thibault, Saint Martin d'Uriage, France, assignor to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Aug. 9, 1976, Ser. No. 712,916
Claims priority, application France, Aug. 22, 1975, 75 25970
Int. Cl.² B01D 5/00
U.S. Cl. 62—55.5 **3 Claims**



1. A cryopump comprising a housing having a single pumping duct with a flange located at the outside end and adapted to connect said cryopump to an enclosure to be evacuated, a valve seating located inwardly in respect of said flange, annular cryogenic trapping means coaxial with said pumping duct, said cryogenic trapping means comprising helium refrigerated trapping means which are located in prolongation of said pumping duct, the radial extent of the central opening in said annular helium refrigerated trapping means being at least as great as that of said pumping duct, and a valve member which extends substantially radially and is mounted to slide axially in said opening in said trapping structure, the axial sliding travel of said valve being at least the axial length of said helium refrigerated trapping means.

4,072,026

METHOD OF COOLING OF ARTICLES AND MATERIALS

Jakob Oberpriller, Baierbrunn, and Dolf Dieter Hofmann, Munich, both of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Jan. 12, 1976, Ser. No. 648,100
Claims priority, application Germany, Dec. 10, 1975, 2555578
Int. Cl.² F25D 13/06
U.S. Cl. 62—63 **6 Claims**

1. In a method of chilling articles or materials wherein a cooling gas stream is produced from a deep-cooling liquefied gas, and the cooling gas stream is passed into direct contact with the articles or materials to chill the same, the improvement which comprises:

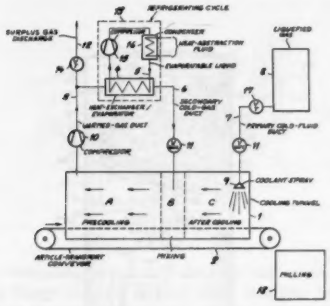
a. evaporating said liquefied gas to produce a first cold gas stream;

b. passing a further gas stream, independent of said first cold gas stream, into direct heat exchange with an evaporating fluid to cool said further gas stream and generate therefrom a second cold gas stream;

c. mixing said first and said second cold gas streams to form a mixture thereof which is brought into direct contact with said articles or materials in the cooling thereof

d. circulating said second cold gas stream at least in part

through a cooling zone traversed by said articles or materials and having a cold end and a warm end, said cold gas streams being mixed in step (c) within said cooling zone, said first cold gas stream being introduced into said cooling zone at a cold end thereof, said second cold gas stream being introduced into said cooling zone at an intermediate location therealong at a temperature greater than the



temperature at which said first cold gas stream is introduced into said cooling zone whereby said second cold gas stream is subjected to heat exchange with said articles or materials;

e. passing said articles or materials through said zone from said warm end to said cold end in countermovement to the gases traversing said zone; and

f. removing the mixed gases at said warm end.

4,072,027

STABILIZED HEAT ACTIVATED HEAT EXCHANGE ABSORPTION PAIR

Morris B. Berenbaum, Summit, N.J.; Francis E. Evans, Hamburg, N.Y.; Richard E. Eibeck, Orchard Park, N.Y., and Martin A. Robinson, East Amherst, N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Jan. 19, 1977, Ser. No. 760,489

Int. Cl.[2] C09K *5/04;* **F25B** *15/02*

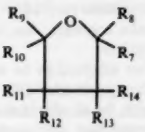
U.S. Cl. 62—112 **24 Claims**

1. A stabilized absorption composition comprising

a. a fluorocarbon as refrigerant selected from the group consisting of monochlorodifluoromethane, dichloromonofluoromethane, trifluoromethane, monochloromonofluoromethane, dichlorotrifluoroethane, monochlorotetrafluoroethane, monochlorotrifluoroethane and mixtures thereof;

b. an asymetrical furan derivative as absorbent of the formula:

where R_1, R_2, R_3, R_4, R_5 and R_6 are each independently H, alkyl having 1–5 carbons, alkoxy having 1–5 carbons, phenyl, alkylene phenyl having 7–11 carbons, hydroxy alkyl having 1–5 carbons, alkoxy alkyl having 2–6 carbons, alkyl carboxylate having 2–6 carbons, fluorine or chlorine, provided that at least one of R_1, R_2, R_3, R_4, R_5 and R_6 has an oxygen atom which has a single bond to a carbon atom; or of the formula



where R_7, R_8, R_9, R_{10}, R_{11}, R_{12}, R_{13} and R_{14} are each independently as defined above for R_1, R_2, R_3, R_4, R_5, and R_6, provided at least one of R_7, R_8, R_9, R_{10}, R_{11}, R_{12}, R_{13} and R_{14} has an oxygen atom which has a single bond to a carbon atom; and

an effective amount of a stabilizer of the formula $(R_1'O)(R_2'O)(R_3'O)P$ wherein R_1', R_2' and R_3' are each independently alkyl, alkenyl, phenyl, alkylene phenyl, alkylene alkylphenyl, or alkylphenyl.

15. A method of absorption heating which comprises

a. releasing heat of solution in the vicinity of an area to be heated by absorbing a fluorocarbon in an asymmetrical furan derivative containing a stabilizer to form the composition of claim 1, heating the resultant solution to release said fluorocarbon from said furan derivative, condensing released fluorocarbon in the vicinity of the area to be heated to form liquid fluorocarbon, evaporating the liquid fluorocarbon at a location removed from the vicinity of the area to be heated and returning the evaporated fluorocarbon to the vicinity of the area to be heated for reabsorption into said solvent furan derivative.

4,072,028

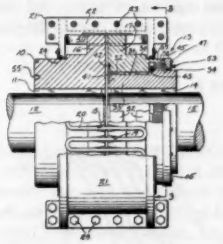
INDEXING COUPLING

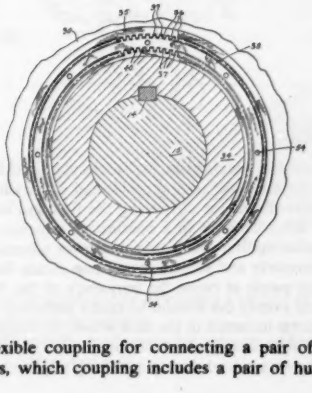
David G. Connell, Milwaukee, Wis., assignor to The Falk Corporation, Milwaukee, Wis.

Filed Aug. 19, 1976, Ser. No. 715,682

Int. Cl.[2] F16D *3/66*

U.S. Cl. 64—24 **1 Claim**





1. In a flexible coupling for connecting a pair of axially aligned shafts, which coupling includes a pair of hubs each

adapted to be mounted on one of said shafts and each including axially directed slots which receive a flexible grid element which couples the hubs together, the improvement wherein one of said hubs comprises:

an inner hub member adapted to be secured to one of said shafts and including a circular cylindrical mounting portion extending from its axially innermost end, and a first series of axially extending gear teeth formed on an external periphery;

an outer hub member which includes said axially directed slots engaged by said grid element, said outer hub member having a central bore extending from its axially innermost end and a sleeve portion projecting axially from its opposite end, said mounting portion of said inner hub member being journaled within said central bore and said sleeve portion having a second series of axially extending gear teeth formed on an internal periphery and which are spaced from and radially aligned with said first series, the number of teeth in said second series being different from the number of teeth in said first series;

an indexing ring axially slidable between said inner and outer hub members and having internal and external gear teeth which mate with said first and second series of gear teeth;

an end ring connectable to the end of said sleeve portion and overlying the ends of the mating series of gear teeth to prevent removal of said indexing ring;

a keeper plate secured to the axially innermost end of said inner hub member and overlying said axially innermost end of said outer hub member, and

an annular spacer disposed in an annular space defined between an intermediate radial wall of said outer hub member and the inner ends of said second series of gear teeth.

4,072,029

RACKING MECHANISMS

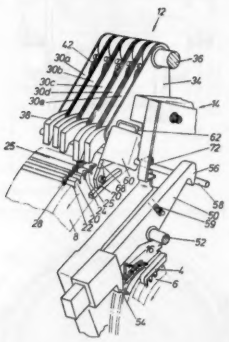
David Arthur Harlow, Coalville, and Gillies Wood, Evington, both of England, assignors to The Bentley Engineering Company Limited, Leicester, England

Filed Apr. 30, 1976, Ser. No. 681,904

Claims priority, application United Kingdom, May 14, 1975, 20257/75

Int. Cl.[2] D04B *15/66*

U.S. Cl. 66—154 R **6 Claims**



1. A racking mechanism for a circular knitting machine which includes a pair of first pawls and a plurality of second pawls, drive means for advancing the first and second pawls over the same distance in a continuous sequence, said drive means including first rotary cam means for advancing the first pawls alternately and second rotary cam means for advancing the second pawls at twice the frequency of the first pawls, a rack wheel evenly cut around its entire periphery and removable elements mounted in the rack wheel for conjoint rotation therewith for causing some of the pawls but not others to engage the rack wheel during a racking sequence.

4,072,030

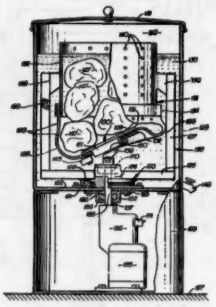
MACHINE FOR CONTROLLED CONDITIONING OF LIQUIDS AND MIXTURE

Leslie H. Garlinghouse, 2415 E. Washington Blvd., Los Angeles, Calif. 90053

Division of Ser. No. 364,881, May 29, 1973, Pat. No. 3,962,892. This application May 7, 1975, Ser. No. 575,437

Int. Cl.[2] D06F *35/00*

U.S. Cl. 68—23 R **4 Claims**



1. A conditioner for liquid-like charges comprising a frame,

a closed housing on the frame,

said housing having a lower, side and top wall structures and a removable closure on one of said structures.

a composite container for said charges comprising a lower flexible section located within said housing and an upper rigid section,

a wobble plate mounted on the bottom of the flexible section,

a wobble drive rotatably journaled in a lower wall structure of said housing and having a driving relationship with said wobble plate,

a motor on said frame at a location below and exterior relative to said housing,

said motor having a one direction driving connection with the wobble drive whereby to impart an oscillatory motion to the flexible section and liquid-like charge therein, a rotatable drive connection between said upper rigid section and the housing, said rotatable drive connection comprising a supporting structure for said container located in said housing, a lower portion of said supporting structure being rotatably mounted on said housing and said rigid section being mounted on and carried by said supporting structure.

4,072,031

SECURITY APPARATUS FOR VEHICLE COMMUNICATIONS ACCESSORY

David W. Kent, 2512 Yonge St., Rockford, Ill. 61103

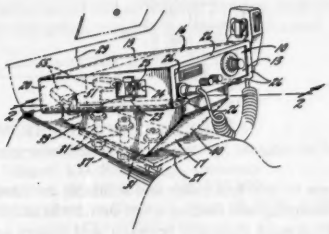
Filed Feb. 8, 1977, Ser. No. 766,571

Int. Cl.[2] E05B *73/00*

U.S. Cl. 70—58 **5 Claims**

1. Security apparatus for a vehicle communications accessory havinfg a case shaped generally as a parallelepiped and defined by top, bottom, front, rear and side walls, said apparatus comprising a box having a top wall and having first and second side walls sized and shaped to telescopically receive said case, the rear of said box being open to permit said case to be telescoped into said box from the rear thereof, lip means on the front of said box and engageable with the front wall of said case to prevent said case from being removed out of the front of said box, first and second flanges projecting inwardly from said first and second side walls, respectively, of said box and underlying the bottom wall of said case, a mounting bracket having front and rear sides, means for anchoring said mounting

bracket to the floor of a vehicle, said mounting bracket having first and second shelves underlying said first and second flanges, respectively, and having first and second plates overlying said first and second flanges, respectively, each shelf and its overlying plate defining a forwardly and outwardly opening channel for receiving the respective flange with said flanges being adapted to be slid into said channels from the front side of said mounting bracket, a first pin extending removably through said first shelf, said first flange and said first plate, a



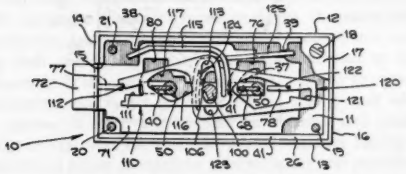
second pin extending removably through said second shelf, said second flange and said second plate, said pins being engageable with the rear wall of said case to prevent said case from being removed from the rear of said box, and first and second security locks connected to said first and second pins, respectively, and preventing unauthorized removal of said pins from said shelves, flanges and plates whereby said pins connect said box to said mounting bracket while said locks prevent unauthorized removal of said box from said bracket.

4,072,032

KEY CHANGEABLE LOCK

Peter J. Phillips, Redondo Beach, Calif., assignor to Klaus Gartner, La Palma and Tim Uyeda, South San Gabriel, both of, Calif.

Filed June 1, 1976, Ser. No. 691,454
Int. Cl.[2] E05B *35/12*
U.S. Cl. 70—339 **20 Claims**



1. In a changeable key lock having a bolt, a plurality of gated tumbler levers and means for operating the bolt only when the tumbler levers are placed in predeterminable positions by manipulation of a selectable key in the lock, the improvement comprising the provision of:

pivot means on one or more of said levers for providing a plurality of individually selectable pivots about which the associated lever may pivot whereby the pivotal axis of each such lever may be varied to provide for different combinations of lever movements required to open the lock; and

releasable fulcrum means for engaging with said lever pivots to restrict each levers movement about a selectable one of said pivots when engaged therewith and being releasable therefrom to allow for the selection of another of said pivots to be engaged thereby, wherein:

said pivot means on each such lever comprises a rack of saw tooth-like teeth formed on an inner surface of an arcuate slot whose radius of curvature intersects the associated lever gate; and

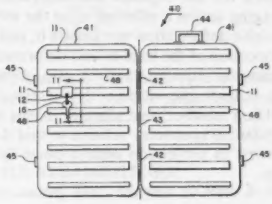
said fulcrum means comprises a fulcrum member and means for mounting said member in said arcuate slot for releasing and re-engaging said pivot means teeth.

4,072,033

KEY HOLDER

George H. Eckerdt, 948 Culver Road, Rochester, N.Y. 14609

Continuation-in-part of Ser. No. 583,047, June 2, 1975, abandoned. This application May 28, 1976, Ser. No. 690,983
Int. Cl.[2] A47G *29/10*
U.S. Cl. 70—456 B **19 Claims**



1. A key holder comprising:

a. a base sheet;

b. means for supporting said base sheet to display keys, said support means comprising a ring binder having rings releasably holding said base sheet by a plurality of holes in said base sheet registering with said rings of said ring binder;

c. said base sheet having a strip formed of one part of a two-part hook-and-loop pile fastener material;

d. a plurality of key tags;

e. a piece of the other part of said two-part hook-and-loop pile fastener secured to a rear face of each of said key tags for removably fastening each of said key tags anywhere along said strip;

f. each of said key tags having a hole; and

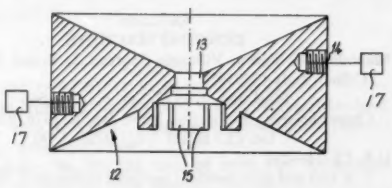
g. a key ring in said hole in each of said key tags for connecting a key to each of said key tags for suspending said keys from said key tags when said key tags are fastened to said strip.

4,072,034

METHOD AND APPARATUS FOR FORMING MATERIAL BY FORCING THROUGH A DIE ORIFICE

Graham Robert Dawson, Bewdley, and Dennis Hugh Sansome, Sutton Coldfield, both of England, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 358,391, May 8, 1973, abandoned. This application July 24, 1975, Ser. No. 598,876
Claims priority, application United Kingdom, May 9, 1972, 21614/72
Int. Cl.[2] B21C *3/00*
U.S. Cl. 72—56 **7 Claims**



1. Apparatus for substantially deforming a section of a workpiece, said apparatus comprising:

a. a circumferentially continuous die with an orifice therein defining a deforming axis;

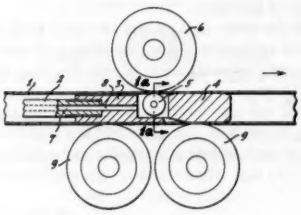
b. power means for forcing the workpiece through said die orifice to effect said deformation;
c. a die holding member assembled with said die;
d. means for supporting said die holding member, said supporting means being disposed with substantially symmetry relative to said deforming axis when viewed in projection onto a plane normal to said axis, so that said axis is held stationary, and
e. vibrator means tuned to the assembly of said workpiece, die and die holding member for vibrating said assembly to cause said assembly as a whole to resonate in a mode in which the die expands and contracts radially, so that a swaging action is effected upon the workpiece to perform positive deformation work upon it, and thereby reduce the proportion of the total of said deformation that said power means are required to effect, said vibrator means comprising at least one vibrator device assembled with said die holding member, said vibrator means being disposed with substantial symmetry relative to said deforming axis when viewed in projection onto a plane lying normal to said axis.

4,072,035

STRENGTHENING OF A WELDING SEAM

Gerhard Ziemek, and Friedrich Schatz, both of Langenhagen, Germany, assignors to Kabel-und Metallwerke, Hannover, Germany

Filed Apr. 15, 1976, Ser. No. 677,172
Claims priority, application Germany, Apr. 18, 1975, 2517248
Int. Cl.[2] B23K *37/00, 31/06*
U.S. Cl. 72—209 **9 Claims**



1. Method of strengthening the welding seam of a longitudinally seam welded, thin-walled, nonferrous metal tube comprising the steps of cold rolling the seam and adjacent zones of the tube which did also soften during the welding, by at least one pair of cylindrical rolls acting on the seam from the inside and the outside of the tube respectively on a flattened portion thereof, including the seam and the adjacent zones and acting in lines of engagement with the seam extending transversely to the welding seam, the rolling progressing transversely to the tube in a length direction of propagation of the tube, thereby strengthening the seam and the adjacent zones by at least 10%; and sizing the tube immediately following the cold rolling.

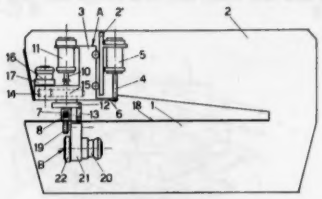
4,072,036

BENDING MACHINE

Marcello Del Fabro, Villaggio Morena 2, Reana Del Rojale (Udine), Italy (33010)

Filed Jan. 7, 1977, Ser. No. 757,666
Claims priority, application Italy, Jan. 8, 1976, 83302/76
Int. Cl.[2] B21D *7/02;* **B21F** *1/00*
U.S. Cl. 72—217 **12 Claims**

1. A rod and wire bending machine comprising, in combination:
at least one bending unit including a fork member with two opposed extremities having a pair of facing side edges for laterally guiding a rod or wire therebetween and at least one pair of projecting ends extending outwardly from each side edge of each extremity, and a bending pin spaced from said fork member and mounted on a disc which is rotatable about said fork member and
at least one feeding unit including a first roller mounted on said fork member and positioned between the facing side edges of said extremities, said first roller being dimensioned to extend within said projecting ends, and an opposed second roller mounted in alignment with and opposite to said first roller and rotatable in either direction for clamping and feeding a rod or wire in either a forward or backward direction between said rollers and said facing side edges of said opposing extremities and beyond said pairs of projecting ends whereby said bending pin may be rotated in either direction to bend a rod or wire around a preselected projecting end of either extremity of said fork member.

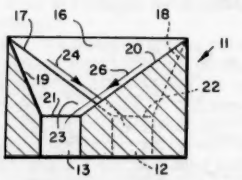


4,072,037

APPARATUS AND METHODS FOR FORMING A PLURALITY OF ELONGATED MEMBERS

Francis Joseph Fuchs, Jr., Princeton Junction, N.J., assignor to Western Electric Co., Inc., New York, N.Y.

Continuation-in-part of Ser. No. 638,495, Dec. 8, 1975, abandoned. This application Mar. 14, 1977, Ser. No. 777,244
Int. Cl.[2] B21C *33/00, 25/02, 23/00*
U.S. Cl. 72—261 **18 Claims**



1. Apparatus for deforming a single metallic workpiece to produce simultaneously a plurality of elongated, metallic members, said apparatus comprising:
a die having an entry wall at one end thereof, and having first and second apertures extending longitudinally therethrough with an entrance end of each aperture located along said entry wall;
said entry wall including first and second entry surfaces, the first entry surface being positioned laterally adjacent to the entrance end of the second aperture while sloping past the entrance end of the second aperture and toward the entrance end of the first aperture, and the second entry surface being positioned laterally adjacent to the entrance end of the first aperture while sloping past the entrance end of the first aperture and toward the entrance end of the second aperture, such that a substantial part of the flow of the metallic material in a single metallic workpiece, forced against the entry wall, will be directed along two neighboring flow paths following said first and second entry surfaces, with the first entry surface directing a first portion of the metallic material past the second aperture and into the first aperture, and with the second entry

surface directing a second portion of the metallic material past the first aperture and into the second aperture, so as to introduce a pattern of cross-shear stresses into the metallic material as said single metallic workpiece is forced against said entry wall; and

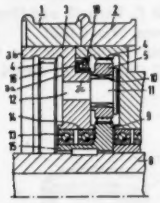
means for forcing the single metallic workpiece against said entry wall with sufficient pressure to cause said first and second portions of the metallic workpiece to pass, respectively, through the first and second apertures simultaneously as the metallic material of the workpiece separates under the influence of said cross-shear stresses, such that a plurality of elongated, metallic members are formed.

4,072,038

WIRE DRAWING MACHINES

Egon Braun, Haag near Schwabach, Germany, assignor to Maschinenfabrik Niehoff KG, Schwabach, Germany

Filed Oct. 26, 1976, Ser. No. 735,187
Claims priority, application Germany, Nov. 10, 1975, 2550373
Int. Cl.[2] B21C *1/02*
U.S. Cl. 72—289 **11 Claims**



1. A drum for a multiple wire drawing machine comprising an arrangement of at least two adjacently located capstan assemblies operatively connected to each other at least one of which is driven by a central drive shaft, each of said capstan assemblies comprising an annular drawing ring and a wheel member located within said drawing ring and connected thereto for conjoint rotation, at least one said driven capstan assembly having a planet member engaging the associated wheel member, and an annular sun member secured to a supporting shaft, means connecting said planet member to the wheel member of the next adjacent capstan assembly to operatively interconnect said adjacent capstans, and permit said planet member to revolve about said sun member and rotate about the central axis, each of said wheel members having a circumferential recess forming an axial shoulder and provided with an annular seal seated thereon slidably engaging a surface of the adjacent capstan assembly.

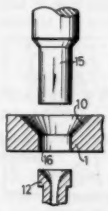
4,072,039

METHOD FOR FORMING COUNTER-SUNK HOLE IN A BASE MATERIAL AND AN APPARATUS FOR CARRYING OUT THE SAME

Yoshitaka Nakanishi, 12-9, Yawata 5-chome, Ichikawa, Chiba, Japan

Filed Dec. 3, 1976, Ser. No. 747,187
Claims priority, application Japan, Apr. 30, 1976, 51-48516
Int. Cl.[2] B21D *28/26*
U.S. Cl. 72—334 **10 Claims**

1. A method of producing counter-sunk holes in a plate-like base, comprising the steps of; punching preliminary holes through a plate-like base; counter-sinking a seat around one end of and coaxially with each preliminary hole by compressing base material surrounding said end of the preliminary hole to force portions of said material into the preliminary hole and out of another end of the preliminary hole while keeping the base plate-like and otherwise avoiding deformation of surfaces of the plate-like base; and punching a finishing hole coaxially



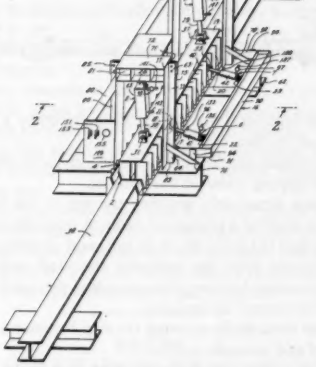
with the countersunk seat and preliminary hole to remove portions of base material forced into the preliminary hole.

4,072,040

PILE STRAIGHTENER

Robert Alan Seyle, Houston, Tex., assignor to Bate & Ramey, Inc., Bellaire, Tex.

Filed Aug. 5, 1976, Ser. No. 711,841
Int. Cl.[2] B21D *1/06*
U.S. Cl. 72—406 **39 Claims**



1. An apparatus for straightening bends in sheet pile at ambient temperature, such sheet pile used for shoring in excavations, for reuse for shoring in excavations, comprising:

a frame;

jig means mounted on said frame for straightening such bent sheet pile, said jig means including a moveable portion; and

means mounted on said frame and connected to said jig means for moving said portion of said jig means in two nonparallel directions.

4,072,041

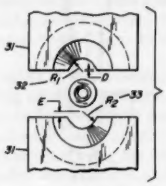
SHORT-CRIMP SURGICAL NEEDLE

John Ronald Hoffman, New Milford, and Peter John Marsland, Monroe, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 691,102, May 28, 1976. This application Dec. 16, 1976, Ser. No. 751,768
Int. Cl.[2] B21D *37/10*
U.S. Cl. 72—416 **1 Claim**

1. A two-piece suymmetrical swaging die for swaging a narrow crimp in a surgical needle having a coaxial cylindrical blind hole in the blunt end to hold a surgical suture therein

comprising: a swaging die having a land having a lap radius the center of which is about 0.0005 to 0.0015 inch outboard of the ends of said die, said lap radius being slightly less than the



needle radius, said die having a width along the axis of the needle less than about half the blind hole depth, and an overlap radius the center of which is about 0.004 to 0.009 inch outboard of the face of said die to permit metal displacement.

4,072,042

AUTOMATIC METAL PULLER

Arturo Servin, and Jose Servin, both of Los Angeles, Calif., assignors to Roger D. Camp and Mattias J. Randall-Ford, part interest to each

Filed Apr. 12, 1976, Ser. No. 654,805
Int. Cl.[2] B21D *1/12*; B25D *17/00*; B25B *19/00*
U.S. Cl. 72—457 **2 Claims**

1. A slap hammer designed for being driven by a pneumatic wrench and the like, comprising:

a conventional slap hammer with an elongated body having a self-tapping screw at the bottom;

a coupling detachably securing the top of the body to an output shaft of a pneumatic wrench whereby the wrench can rotate the body about its axis, said coupling including a universal joint for receiving the shaft and a flexible compressible hollow boot covering the joint when the shaft is secured to the joint;

a harness detachably securing the slap hammer to the housing of said wrench; and

a race of roller bearings secured to said body below the coupling, said harness encircling the race in a manner at which the race and harness are kept from separating and the race is allowed to rotate within the harness.

4,072,043

METHOD AND SYSTEM FOR DETECTING HYDROGEN IN AN INERT GAS STREAM

Kenneth C. Naizer, Nederland, and Jesse K. DuBose, Beaumont, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,048
Int. Cl.[2] G01N *31/00*
U.S. Cl. 73—23 **5 Claims**

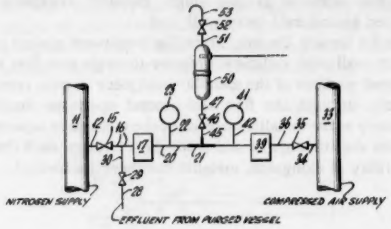
1. A system for monitoring an inert gas stream in order to detect hydrogen therein, comprising in combination

a chamber for passing at least a portion of said gas stream therethrough and having an inlet and an outlet,

said chamber inlet having a reduced cross sectional area relative to said chamber,

means associated with said inlet for diffusing mixed gas streams and for collecting any moisture therefrom,

said diffusing means comprising a pair of perforated diffusion plates mounted on a common support and extending transversely across said inlet and said chamber adjacent to said inlet,



means for mounting a hydrogen detector in said chamber down stream from said diffusing means, and

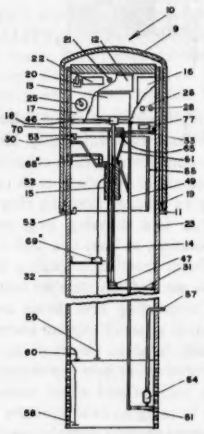
means for preventing moisture from entering said outlet.

4,072,044

LIQUID LEVEL CONTROLLER AND SOIL TEST INSTRUMENT

Allen C. Farwell; Dale E. Farwell, and Duane C. Farwell, all of Rte. 1, Cottage Grove, Wis. 53527

Filed Mar. 5, 1976, Ser. No. 664,190
Int. Cl.[2] G01F *23/10*; G01N *15/08*
U.S. Cl. 73—38 **6 Claims**



1. A liquid level controller comprising in combination:

a. a reversibly drivable electric motor,

b. an output shaft for said electric motor,

c. an electrode mounted to be traversed longitudinally of said output shaft by operation of said electric motor rotating said shaft,

d. a reversing switch for said electric motor wherein said reversing switch is actuated by said elctrode coming into contact with a body of electrically conductive liquid to establish an electric current path therethrough,

e. a supply valve for electrically conductive liquid,

f. valve biasing means for said supply valve actuated by traverse of said electrode,

g. a timer controlled switch for energizing said electric motor,

h. a motor de-energizing switch actuated by traverse of said electrode, said controller functioning in repetitive cycles wherein said conductive liquid may issue from said supply valve to fill a confined space, which is traversed by said electrode driven by said timer controlled switch operated

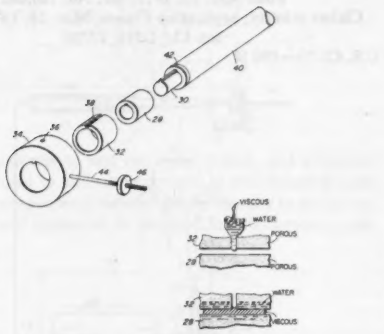
motor for periodically sensing liquid elevation in the confined space, a motor reversing circuit being completed by said electrode making contact with conducting liquid to actuate retrival of said probe and replenishment of liquid to datum level in the confined space.

4,072,045

VISCOMETER FOR INDICATING RHEOLOGICAL PROPERTIES OF FLUIDS HAVING HIGH AND LOW VISCOSITY COMPONENTS

Louis Kopito, Brookline, Mass., assignor to Ovutime, Inc., Brookline, Mass.

Filed Sept. 10, 1976, Ser. No. 722,229
Int. Cl.² G01N *33/16*
U.S. Cl. 73—54 **16 Claims**



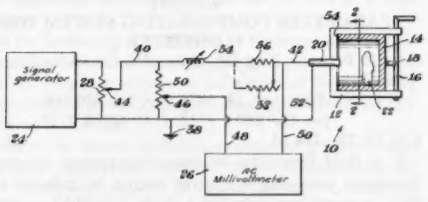
9. A process for tesing a fluid sample having at least a high viscosity component and at least a low viscosity component, said process comprising the steps of interposing a fluid sample between a first bearing means and a second bearing means, at least one of said bearing means presenting a porous surface, absorbing said low viscosity component into said porous surface, biasing said first bearing means and said second bearing means with respect to each other, and means for indicating the relative motion of said first bearing means with respect to said second bearing means as an indication of the characteristics of said fluid sample.

4,072,046

ACOUSTIC PYCNOMETER

Binneg Yanbing Lao, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Sept. 3, 1976, Ser. No. 720,480
Int. Cl.² G01M *17/00*
U.S. Cl. 73—574 **4 Claims**



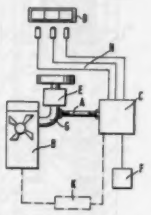
1. Pycnometer apparatus comprising an enclosable chamber for receiving a sample whose volume is to be measured, an electro-acoustical transducer coupled to the interior of said chamber, electronic signal generator means for electrically energizing said transducer at a predetermined frequency having a wave length at least four times the longest dimension of said chamber, electrical bridge circuit means coupled between said means for electrically energizing and said electro-mechanical transducer, said bridge circuit including means for nulling the signal across said bridge circuit when said chamber is empty, and means for reading the signal across said bridge when a sample is disposed in said chamber, the magnitude of said signal being a function of the volume of the sample.

4,072,047

METHOD AND APPARATUS FOR MONITORING INTAKE MANIFOLD VACUUM

Anton Reismüller, Goppingen, Germany, assignor to Remesta GmbH, Heiningen, Germany

Filed Nov. 15, 1976, Ser. No. 742,129
Claims priority, application Germany, Nov. 15, 1975, 2551359
Int. Cl.² G01L *23/24*
U.S. Cl. 73—115 **7 Claims**



1. A method for continuously monitoring and telemetering the momentary operating condition of a motor vehicle engine with respect to the vacuum created in the intake manifold of the engine as output and reference quantity, comprising the steps of:

1. continuously sampling the vacuum in the intake manifold of the engine;
2. utilizing changes in the vacuum pressure to produce an electrical signal having a plurality of stages representing different successive levels of vacuum pressure;
3. feeding this electrical signal to an electronic switching station linked with the electrical power supply of the vehicle; and
4. utilizing electricity from said electrical power supply as directed by said electronic switching station to actuate a signal that can be sensed by the operator, said signal informing the operator as to the state of the vacuum in the intake manifold at that particular instant.

4,072,048

INDICATING APPARATUS FOR MEASURING THE PRESSURE OF A FLUID WITHIN A CONTAINER

John Arvan, 61 S. Regent St., Port Chester, N.Y. 10573

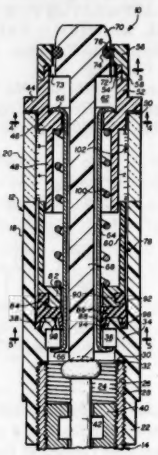
Filed Apr. 1, 1976, Ser. No. 672,657
Int. Cl.² B60C *23/02*
U.S. Cl. 73—146.8 **9 Claims**

1. An indicating apparatus for measuring the pressure of a fluid within a container, said apparatus comprising:

a. a housing one end adapted to be mounted on a valve assembly communicating with the container, said housing further having a range of scale indicia from a minimum value to a maximum value representative of the pressure of the fluid within said container between a predetermined range of pressures;
b. a collar having a through-opening mounted to another end of said housing;
c. a sleeve supported within said housing, the opposite ends of said sleeve extending outwardly in overlying and clamping relationship to portions of said housing and said collar, respectively, to secure said collar in nested relation to said housing;
c. a plunger reciprocally supported within said sleeve for movement between an inoperable position wherein the valve of the container is closed and an operate position wherein said plunger engages and opens said valve to

provide a path for the flow of the fluid from the container into said housing, said plunger having an end accessible through the opening in said collar;

d. indicator means supported within said housing for movement by the fluid from a non-indicating position to an indicating position when the pressure of said fluid is above a predetermined amount, said indicator means being movable relative to said scale indicia to provide a reading



between said minimum and maximum values representative of the pressure of the fluid within said container when said pressure is within said predetermined range of pressures;

e. said having a passage for directing the fluid to said indicator means when said plunger is in its operate position; and

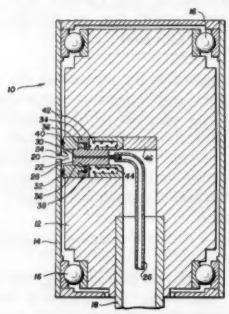
f. said housing having means for viewing the indicator means in its indicating position.

4,072,049

APPARATUS FOR MEASURING SURFACE PRESSURES ON SPINNING AERODYNAMIC BODIES

Miles C. Miller, Joppatowne, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 15, 1977, Ser. No. 788,067
Int. Cl.[2] G01M *9/00*; G01L *7/00*
U.S. Cl. 73—147 **10 Claims**



1. Apparatus for measuring surface pressure on a spinning body in an aerodynamic chamber comprising:

a shell means having the configuration of said body and at least one aperture through the surface of said shell means;

first positioning means connected to said shell means for rotating said shell means about the shell means' longitudinal axis;

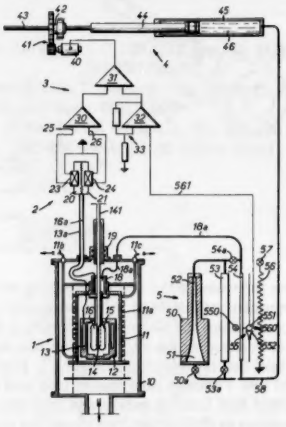
sensor means having a cavity in the interior of said shell means and aligned along said longitudinal axis with said aperture and a pressure transducer connected to said cavity, said sensor means measure the pressure at the point on the shell means surface defined by the radial alignment of said cavity and aperture.

4,072,050

ISOTHERMAL CALORIMETRY PROCESS AND CALORIMETER FOR CARRYING OUT THE PROCESS

Leon Ter-Minassian, Fresnes, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Hauts-de-Seine, France

Filed Mar. 23, 1977, Ser. No. 780,482
Claims priority, application France, Mar. 26, 1976, 76 08792
Int. Cl.[2] G01K *17/00*
U.S. Cl. 73—190 R **11 Claims**



1. A calorimetry process for determining the quantity of thermal energy given out or taken up by a sample during an isothermal change of state between two physico-chemical states, wherein said sample is maintained at a constant temperature during said change of state by varying the pressure of a gas contained in a control chamber which is in thermal contact with said sample, the quantity of thermal energy given out or taken up being determined by measuring the variation of the pressure of said gas.

4,072,051

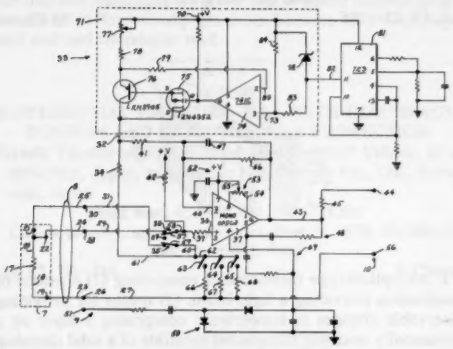
PARAMETER COMPENSATING SYSTEM FOR A FLOWMETER

Jerry R. Peterson, Erie, Pa., assignor to Geosource, Inc., Houston, Tex.

Filed Apr. 28, 1976, Ser. No. 680,919
Int. Cl.[2] G01F *1/12, 1/86*; G01K *7/20*
U.S. Cl. 73—194 M **35 Claims**

1. A fluid flowmeter compensating system, comprising a flowmeter providing a metered output in response to fluid flow, a transducer including a probe providing an output in response to a sensed parameter of the fluid, a converter connected to said transducer through means providing a connecting curcuit and providing an output varying in response to the relative difference between the sensed parameter of the fluid and a preselected reference parameter for the fluid, said converter including means providing a source operatively connected to supply a constant signal through a series connected circuit including said probe provided by said transducer and a

reference impedance having a preselected magnitude corresponding to said preselected reference parameter and means responding to the signal variations across said series connected circuit and providing a variation responsive signal continually tracking the change in the sensed parameter with respect to the



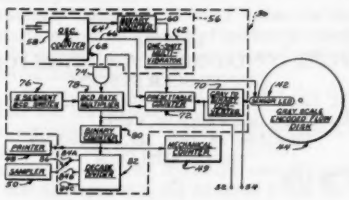
reference parameter to said converter output, and utilization means connected to said converter and to said flowmeter and providing a compensated metered output relating to said preselected reference parameter in response to said converter output.

4,072,052

FLOW PROPORTIONER

Louis Franklin Lederer, Raymond, Nebr., assignor to Instrumentation Specialties Company, Lincoln, Nebr.

Filed Aug. 18, 1976, Ser. No. 715,320
Int. Cl.[2] G01F *1/52*
U.S. Cl. 73—215 **27 Claims**



1. An apparatus for measuring the rate of flow of a fluid comprising:

means for measuring a fluid level to represent a non-linear function of a rate of flow of a fluid;

electronic means responsive to the measured fluid level for generating an electrical output signal representing the rate of flow of the fluid;

said electronic means including a function generator disc having a digital code recorded thereon representing the non-linear flow rate and an sensor assembly to sense the digital code to provide the electrical output signal representing the rate of flow of the fluid; and

positioning means operatively connected to said measuring means for positioning said function generator disc with respect to said sensor assembly;

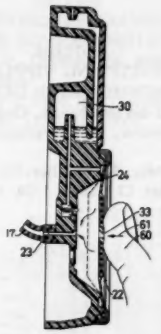
said measuring means comprising a bubbler system having a pressure transducer for converting the measured fluid pressure corresponding to the fluid level to an electronic signal proportional to the fluid level.

4,072,053

APPARATUS FOR INDICATING LIQUID LEVEL IN A RECEPTACLE

Stig Lennart Anderson, 4 Naverlursgatan, Vastra Frolunda, Sweden (S-421 44)

Filed Nov. 4, 1976, Ser. No. 738,895
Claims priority, application Sweden, Nov. 5, 1975, 7512363
Int. Cl.[2] G01F *23/16*; G01L *7/08*
U.S. Cl. 73—303 **8 Claims**



1. Apparatus for indicating the liquid level in a receptacle, more particularly the oil level in the crankcase of an internal combustion engine, said apparatus comprising:

a measure tube extending downwards into the crankcase below the lowermost design oil level;

an indicating member connected to said measure tube by means of a slender flexible tube;

means defining an air chamber in the indicating member, said air chamber being in air communication with said measure tube through the slender flexible tube;

means defining a liquid chamber in the indicating member, said liquid chamber containing a quantity of liquid trapped therein below a column of air;

an indicating tube in said indicating member having fluid communication with the liquid in said liquid chamber, said indicating tube having a transparent vertical wall and adapted to receive liquid from the liquid chamber to a height corresponding to the oil level in the crank case;

means in said indicating member defining a narrow passage connecting said air chamber and the air above the liquid in said liquid chamber and including means connecting said air above the liquid and the ambient air for communication of air therebetween and between said measure tube and said liquid chamber;

a pump member in the form of a wall defining one side of said air chamber and including means oeprational for separating said air chamber from the ambient air, said pump member being formed at least partly of a resilient diaphragm around a central wall portion and being manually pushable inwardly of said air chamber to a home position against a bottom wall thereof, the resilient diaphragm portion of said pump member being effective to first close said narrow passage to thereby close off air communication between said air chamber and the ambient air and the air above the liquid in said liquid chamber upon initial movement inwardly of the resilient diaphragm when said pump member is pushed inwardly of the air chamber; and

a normally closed valve member located in said indicating member in an alternate passage connected to said narrow passage between said air chamber and the air above the liquid in said liquid chamber, said valve member being operable on pushing said pump member inwardly and fully home to thereby open air communication between said measure tube and the air above the liquid in said liquid chamber after closeoff of said air chamber and ambient air

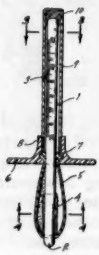
therefrom to enable indicating liquid to rise in said indicating tube to a height corresponding to the oil level in the crank case by air pressure being transmitted therethrough to said liquid chamber from said measure tube.

4,072,054

COMBINED PACIFYING NIPPLE AND MOUTH THERMOMETER DEVICE

Michel Blouin, 2815 des Pruches St., Orsainville, Canada (GEG 2B2), and Leo Mercier, 1778 Bergemont St., Quebec, Canada (3)

Filed Mar. 9, 1976, Ser. No. 665,241
Int. Cl.² G01K *5/04, 1/14*
U.S. Cl. 73—343 R **1 Claim**



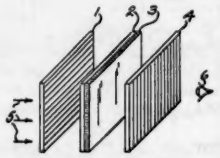
1. A combined pacifying nipple and mouth thermometer device comprising a liquid thermometer tube including a temperature displaying main portion and a liquid bulb portion at one end of the main portion, a flexible pacifying nipple including a flexible tubular mouth-piece portion having an outer end and an inner end, a lip abutment flange fixed to said inner end and surrounding the same, the outer end and the inner end of said mouthpiece portion both having apertures aligned longitudinally of the pacifying nipple, the liquid thermometer tube having a part of its main portion extending through said mouth-piece portion and frictionally extending through both apertures such that said liquid bulb portion is located exteriorly of said mouth-piece portion adjacent said outer end and the remaining part of said main portion of said thermometer tube extends exteriorly from the inner end of said mouthpiece portion, an elastic sleeve tightly engages over a substantial portion of the part of said thermometer tube extending within said mouthpiece portion, said elastic sleeve having an outer end disposed short of said liquid bulb portion, the marginal portion of the aperture at the outer end of said mouthpiece portion abutting against said outer end of said sleeve, and a transparent protector tube having an open end removably secured to said abutment flange and surrounding the temperature displaying main portion of said thermometer tube and having a closed end at its outer end engaged over the other end of the thermometer tube and wherein the aperture at the inner end of said mouthpiece portion forms an annular external bead, said inner end engages in a recess made in the aperture of said lip abutment flange, the latter being further integrally formed with an internally threaded sleeve portion axially projecting away from said mouthpiece portion and said protector tube is removably screwed within said internally threaded sleeve portion and abuts said bead and axially compresses the latter to cause the same to tightly engage said thermometer tube to prevent sliding of the thermometer tube relative to said lip abutment flange.

4,072,055

VISUAL-TYPE TEMPERATURE-RESPONSIVE DEVICE

Stanley B. Elliott, 7125 Conelly Blvd., Bedford, Ohio 44146

Continuation of Ser. No. 559,066, March 17, 1975, abandoned. This application Jan. 14, 1977, Ser. No. 759,483
Int. Cl.² G01K *11/12*
U.S. Cl. 73—356 **33 Claims**



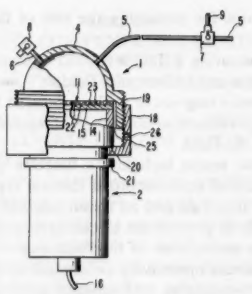
1. An optical-type thermometer comprising (1) a source of illumination providing a light-beam, (2) means for providing observable changes in temperature comprising a layer on a substantially isotropic transparent substrate of a solid chemical composition of constant melting point that of itself senses changes in temperature, the composition being abruptly triggered at a predetermined temperature from an anisotropic solid transmission state characteristic of the first temperature immediately contiguous to the predetermined temperature to an isotropic liquid state characteristic of the second temperature, (3) means to intensify observable changes in the brightness and intensity of the light coming from the composition when the light-beam contacts the composition comprising a polarizer for polarizing the light-beam and an analyzer for analyzing the beam, the light-beam traveling through the composition that doubly refracts the beam when birefringent at the first temperature to pass the beam on through the analyzer, (4) light detecting means for detecting observable changes in the brightness and intensity of the light coming from the composition when the light-beam contacts the composition, the light from the composition at the first temperature being of sufficient brightness and intensity to provide an optical signal at the first temperature but not at the second temperature.

4,072,056

FLUID CONTAINMENT STRUCTURE FOR TRANSDUCER SYSTEM

Arnold St. Jacques Lee, Portola Valley, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed June 28, 1976, Ser. No. 700,269
Int. Cl.² G01L *7/08*
U.S. Cl. 73—706 **8 Claims**



1. In pressure transducer apparatus comprising a pressure transducer having a pressure transducing wall and means for providing an electrical output representative of pressure exerted against said wall, wall means forming a structure for

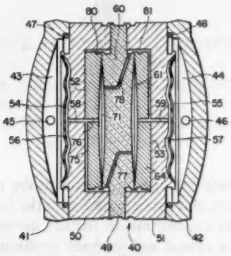
containing fluid for pressure interaction with said transducer wall without direct contact between the fluid and said transducer wall, said fluid containment structure having a diaphragm wall positioned for contact with said transducer wall, said diaphragm wall being sufficiently compliant to provide transmission between fluid pressure in said containment structure and said transducer wall; the improvement wherein means are provided for venting gas from between said diaphragm wall and said transducer wall.

4,072,057

DIFFERENTIAL PRESSURE CELL WITH DIAPHRAGM TENSION AND OVERPRESSURE PROTECTION

Takeshi Yasuhara; Mitsuru Tamai, and Tadanori Yuhara, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Sept. 8, 1976, Ser. No. 721,635
Claims priority, application Japan, Sept. 9, 1975, 50-109112
Int. Cl.[2] G01L *7/08*
U.S. Cl. 73—718 **8 Claims**



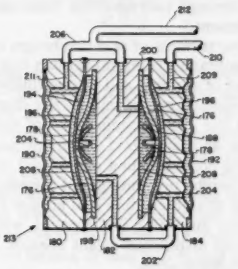
1. A differential pressure sensing cell, comprising:
a) a measuring chamber having electrically insulating walls,
b) a measuring diaphragm mounted within the measuring chamber and dividing it into first and second closed chambers,
c) measuring diaphragm displacement sensing elements mounted on the insulating walls,
d) an auxilliary chamber,
e) an auxilliary diaphragm mounted within the auxilliary chamber and dividing it into third and fourth closed chambers, the auxilliary diaphragm being more flexible than the measuring diaphragm,
f) casing means surrounding and mounting the measuring chamber and the auxilliary chamber, and defining a first recess surrounding the auxilliary chamber and a second recess surrounding the measuring chamber,
g) a first pressure-receiving diaphragm movably responsive to a first input pressure and mounted within the casing means to define a first pressure-receiving chamber,
h) a second pressure-receiving diaphragm movably responsive to a second input pressure and mounted within the casing means to define a second pressure-receiving chamber,
i) fluid sealed within and filling the measuring and auxilliary chambers, the first and second recesses, and the first and second pressure-receiving chambers,
j) first fluid passage means interconnecting the first pressure-receiving chamber, the first recess, and the first and third closed chambers, and
k) second fluid passage means interconnecting the second pressure-receiving chamber, the second recess, and the second and fourth closed chambers, whereby radial tension of the measuring diaphragm due to static differential pressure between the interior and exterior of the measuring chamber is minimized by substantially equalizing the interior and exterior pressures through said first and second fluid passage means, and over-pressure protection of the measuring diaphragm when the pressure differential between the first and second pressure-receiving chambers becomes too large as attained by causing the first or second pressure-receiving diaphragm to contact the casing before the measuring diaphragm contacts the casing before the measuring diaphragm contacts the casing while absorbing the change in volume of the first or second pressure-receiving chamber by the action of the auxilliary diaphragm through the first or second fluid passage means, respectively.

4,072,058

DIFFERENTIAL PRESSURE TRANSMITTER WITH PRESSURE SENSOR PROTECTION

Robert C. Whitehead, Jr., Oreland, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 3, 1976, Ser. No. 682,280
Int. Cl.[2] G01L *7/08*
U.S. Cl. 73—720 **5 Claims**



1. A differential pressure to electrical signal transmitter comprising
a head structure having a plurality of surfaces,
a first barrier diaphragm mounted in spaced and sealed relationship to a first one of said surfaces to form a first fluid chamber between one face of said first diaphragm and said first surface,
a second barrier diaphragm mounted in spaced and sealed relationship to a second one of said surfaces to form a second fluid chamber between one face of said second diaphragm and said second surface,
means for applying a first force to the other face of said first diaphragm which is representative of a first fluid pressure and which urges said first diaphragm toward said first surface,
means for applying a second force to the other face of said second diaphragm which is representative of a second fluid pressure and which urges said second diaphragm toward said second surface,
control diaphragm means mounted in spaced and sealed relationship to third and fourth ones of said surfaces to form a third fluid chamber between one face of said diaphragm means and said third surface, and to form a fourth fluid chamber between another face of said diaphragm means and said fourth surface,
differential pressure sensor means located at a position remote from said head structure and including a sensing element having first and second element portions and an electrical output connection and operative to produce in said output connection a signal representative of the difference between the pressures of two fluids acting, respectively, on said first and second element portions, said element experiencing only a minute displacement as said pressure difference traverses its normal operating range,
first passage means interconnecting said first chamber and said third chamber,
second passage means interconnecting said second chamber and said fourth chamber,
a first length of capillary tubing extending between said head

structure and said sensor means and constituting a fluid connection between said first element portion and said first and third chambers,

a first substantially incompressible fill fluid completely filling said first and third chambers, said first passage means, and said first length of capillary tubing and acting on said first element portion by way of said first length of capillary tubing,

a second length of capillary tubing extending between said head structure and said sensor means and constituting a fluid connection between said second element portion and said second and fourth chambers, and

a second substantially incompressible fill fluid completely filling said second and fourth chambers, said second passage means, and said second length of capillary tubing and acting on said second element portion by way of said second length of capillary tubing, the dimensions of said first and second lengths of capillary tubing being such as to minimize the transfer of sensor-damaging heat and pulses through said fill fluids from said head structure to said element,

the relative stiffness of said diaphragm means and said barrier diaphragms being made such that an excessive value of either of said first and second fluid pressures causes the corresponding one of said barrier diaphragms to bottom-out on the corresponding one of said first and second surfaces, and causes said diaphragm means to deflect away from the corresponding one of said third and fourth surfaces, thereby preventing said pressure difference on said element from exceeding said normal operating range and adversely displacing said element, wherein

said control diaphragm means consists of first and second control diaphragms,

said one face of said diaphragm means is one face of said first control diaphragm,

said another face of said diaphragm means is one face of said second control diaphragm,

said head structure has fifth and sixth surfaces,

said first control diaphragm is mounted in spaced and sealed relationship to said fifth surface to form a fifth fluid chamber between the other face of said first control diaphragm and said fifth surface,

said second control diaphragm is mounted in spaced and sealed relationship to said sixth surface to form a sixth fluid chamber between the other face of said second control diaphragm and said sixth surface,

said first passage means includes an interconnection to said sixth chamber,

said second passage means includes an interconnection to said fifth chamber,

said first fill fluid completely fills said sixth chamber, and

said second fill fluid completely fills said fifth chamber.

4,072,059

GRAIN PROBE

James T. Hamilton, Decatur, Ill., assignor to Jaham Mfg. Co., Inc., Warrensburg, Ill.

Filed Feb. 10, 1977, Ser. No. 767,540
Int. Cl.[2] G01N *1/14*
U.S. Cl. 73—423 R **7 Claims**

1. A sampling device for insertion into a body of confined grain, including in combination:

a tubular probe member having a closed lower end with an opening therein and a plurality of vertical spaced openings extending the length thereof,

gate means having a plurality of sectional spaced openings therein, said gate means being engageable with said tubular probe member and movable from a closed position wherein said gate means substantially closes said plurality of vertical spaced openings in said probe member to an open position wherein said vertical openings on said gate means are in alignment with said vertical spaced opening on said tubular probe member,

bracket means mounted on the end of said tubular probe member opposite the closed lower end,

probe mounting means attached to said bracket means to hold said tubular probe member in substantially a vertical position,

suction means operatively connected to said opening on said closed lower end of said probe member, and

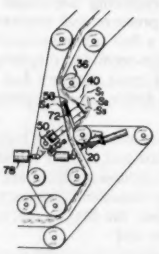
control means for operating said probe mounting means in positioning said probe member in the body of the confined grain, said control means further moving said gate means between a closed and an open position to permit grain to fill said tubular probe member and actuating said suction means to withdraw the collected grain from said probe when the same has been withdrawn from the body of the confined grain.

4,072,060

APPARATUS FOR SAMPLING PRINTED SHEETS FROM A CONTINUOUS STREAM OF SUCH SHEETS

Mitsuo Kitai, Kawasaki, and Koichi Yamashita, Yokohama, both of Japan, assignors to Kabushiki Kaisha Tokyo Kikai Seisakusho, Tokyo, Japan

Filed Mar. 11, 1977, Ser. No. 776,897
Claims priority, application Japan, Mar. 22, 1976, 51-29848
Int. Cl.[2] G01N *1/04*
U.S. Cl. 73—423 R **7 Claims**



1. Apparatus for taking samples from a continuous row of printed sheets travelling in overlapping relationship along a predetermined path, comprising in combination:

divider means movable between a first and a second position with respect to the predetermined path, said divider means when moved to said second position being disposed in the predetermined path so as to cause some consecutive ones of the printed sheets to travel on one side thereof and

the succeeding printed sheets to travel on the other side thereof;

first actuator means for moving said divider means between said first and said second positions;

extractor means movable between a third and a fourth position past the predetermined path, said extractor means being moved, following the movement of said divider means from said first to said second position, from said third to said fourth position for traversing the predetermined path from said other to said one side of said divider means and thus for extracting at least the last of said some consecutive printed sheets from the predetermined path; and

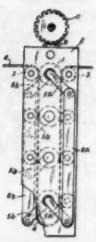
second actuator means for moving said extractor means between said third and said fourth positions.

4,072,061

ROLLER DRIVE ASSEMBLY FOR PHOTOGRAPHIC PROCESSORS

Jerry A. Caflisch, Minneapolis, Minn., assignor to Pako Corporation, Minneapolis, Minn.

Filed Feb. 17, 1976, Ser. No. 658,540
Int. Cl.[2] F16H *21/14*
U.S. Cl. 74—67 **4 Claims**



1. In a photographic processor unit, a roller assembly for conveying photographic sheet material through the photographic processor unit at an essentially uniform speed without slippage and with generally constant tension along the photographic sheet material's entire length, said assembly comprising

a plurality of transport rollers positioned to define a predetermined path for engaging and transporting photographic sheet material through the processor unit, certain of said rollers having their axes disposed in parallel coplanar relation,

one set of crank arms respectively fixed to corresponding ends of said coplanar rollers and disposed in parallel relation to each other.

a second set of crank arms respectively fixed to the opposite ends of said coplanar rollers and disposed in parallel relation to each other,

a pair of connecting bars respectively pivotally connected to said two sets of crank arms for driving said coplanar rollers,

said two sets of crank arms being disposed in sufficiently out-of-phase relation with respect to the other set of crank arms to prevent an over center reversal of the driving direction of said coplanar rollers, and

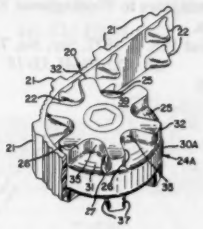
means for supplying rotary driving power to one of said rollers, whereby the photographic sheet material is transported through the photographic processor unit along the predetermined path.

4,072,062

SELF-CLEANING SPROCKET

Roy W. Morling, Elmhurst; Robert J. Mackert, and Elmer M. Kesl, both of Downers Grove, all of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Dec. 27, 1976, Ser. No. 754,711
Int. Cl.[2] F16H *55/30, 7/00*
U.S. Cl. 74—243 R **23 Claims**



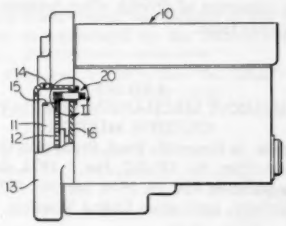
1. A self-cleaning sprocket for use with an endless belt having internal lugs for engaging the sprocket comprising a body of material having a disk-like base portion having an outer periphery, a plurality of radial circumferentially spaced ribs extending axially from said base portion, said ribs converging to a center hub and defining, with said base portion, a plurality of lug receiving pockets therebetween having open axial ends opposite said base portion, the surface of said base portion in said pockets sloping toward said open ends from said periphery to said hub and the surface of said hub in said pocket sloping radially inwardly from the base portion toward said open axial ends, the intersection of said base portion and said hub portion being filletted such that the flow of debris from said base portion surface to said hub surface is facilitated.

4,072,063

ENGINE CRANKING ADAPTER

Harold Joseph Nauman, Dunlap, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 14, 1977, Ser. No. 768,122
Int. Cl.[2] F16H *1/06*
U.S. Cl. 74—405 **10 Claims**



1. In an engine structure having a flywheel, a ring gear mounted for rotation with the flywheel, a wall adjacent the ring gear, and starter motor mounting means on said wall for mounting of a starter motor thereon to have driving engagement with the teeth of the ring gear, the improvement comprising:

a cranking adapter having a midportion, a first pinion at one end, and a second pinion at the opposite end, said first pinion being adapted to mesh with ring gears having a first preselected configuration and said second pinion being adapted to mesh with ring gears having a second, different preselected configuration;

adapter mounting means for readily removably, rotatably mounting said midportion of the adapter to said wall with

a selected one of said pinions meshing with said ring gear; and

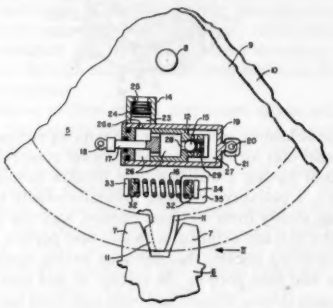
means for transmitting a rotational force to said pinion for rotating the flywheel through the selected meshed pinion.

4,072,064

ANTI-BACKLASH GEAR ASSEMBLY

Wayne B. Lloyd, Baltimore, and John H. Staehlin, Lutherville, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 2, 1977, Ser. No. 765,031
Int. Cl.[2] F16H *55/18*
U.S. Cl. 74—409 4 Claims



1. An anti-backlash gear assembly comprising,

mating gears having interengaging teeth for effecting a driving relationship therebetween,

geartooth clearance adjusting means for said mating gears,

hydraulic piston means operatively connected to said gear-tooth clearance adjusting means,

an accumulator storing hydraulic fluid for supply to said piston means,

check valve means for retaining hydraulic fluid supplied to said piston means, and

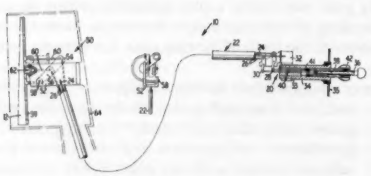
bias means for urging hydraulic fluid to flow from said accumulator to said piston means via said check valve means upon existence of any backlash-inducing clearance during relaxation of driving effort between said interengaging gear teeth.

4,072,065

ADJUSTMENT MECHANISM FOR DAY/NIGHT OUTSIDE MIRROR

Guido Perrella, 28 Senneville Road, Senneville, Quebec, Canada

Continuation of Ser. No. 430,262, Jan. 2, 1974, abandoned. This application Apr. 19, 1976, Ser. No. 677,937
Claims priority, application United Kingdom, Nov. 6, 1973, 51480/73
Int. Cl.[2] F16C *1/10*
U.S. Cl. 74—502 4 Claims



1. Apparatus for providing selective positioning of an article on an article support means by movement of a vertical actuator and a horizontal actuator on an actuator support means, comprising,

a reference wire of fixed length connecting the actuator support means with the article support means,

a pair of movable input lever elements supported for pivotal movement with respect to the actuator support means and each being operatively connected to a respective one of said actuators,

a pair of longitudinally movable wires ech having a first end connected to one of said movable input lever elements, said wires being movable independently of each other,

a pair of movable remote lever elements supported for pivotal movement with respect to the article support means, said remote lever elements being operatively connected to said article to effect respective vertical and horizontal movement thereof,

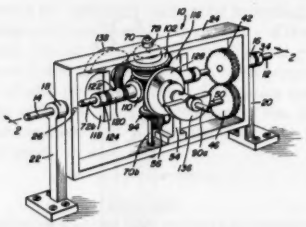
said longitudinally movable wires each having a second end connected to one of said movable remote lever elements to permit independent vertical and horizontal movement of said article by respective movement of said vertical actuator and said horizontal actuator.

4,072,066

CENTRIFUGAL FORCE CONTROLLED TRANSMISSION

Donald L. Mount, Rte. 1 - Box 188, Memphis, Mo. 63555

Filed June 22, 1976, Ser. No. 698,701
Int. Cl.[2] F16H *3/74*
U.S. Cl. 74—752 F 11 Claims



1. A variable drive ratio transmission, comprising input and output elements, a carrier frame connected to one of said elements for rotation about a fixed axis, a spindle, means mounting the spindle in the carrier frame for rotation about a first movable axis, eccentric rotor means of variable unbalance rotatably mounted on the spindle for rotation about a second movable axis intersecting the first movable axis on said fixed axis, planet gear means drivingly connecting the other of the elements to the spindle for rotation thereof relative to the carrier frame about said first movable axis, and reaction gear means drivingly connecting the carrier frame to the eccentric rotor means for varying the unbalance thereof in response to relative rotation between the carrier frame and said spindle.

4,072,067

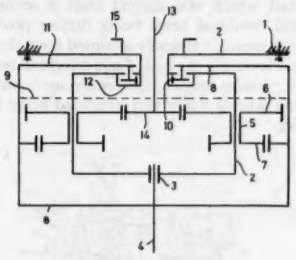
PLANETARY GEARING WITH CLOSED HOUSING

Heinrich Benthake, Mulheim (Ruhr), Germany, assignor to WGW Westdeutsche Getriebe- und Kupplungswerke GmbH, Bochum, Germany

Filed Apr. 23, 1976, Ser. No. 679,678
Claims priority, application Germany, Apr. 24, 1975, 2518113
Int. Cl.[2] F16H *57/08*
U.S. Cl. 74—789 4 Claims

1. Planetary gearing comprising: a stationary support, an outer housing rotatably suspended from said support, said housing including internal gear teeth and being adapted to contain a lubricant, said stationary support including an inner portion extending within said housing, a driving gear rotatably mounted within said inner stationary support portion and housing, satellite gear means rotatably mounted on said inner

stationary support portion and coupling said driving gear with the internal gear teeth of said housing, a first bearing rotatably coupling said housing with said stationary support, said first bearing being enclosed within said housing above the level of lubricant to be contained in said housing, and a second bearing mounted on said inner stationary support enclosed within said



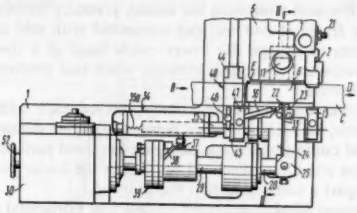
housing, said housing including output coupling means rotatably mounted in said second bearing, said satellite gear means comprising a plurality of satellite gears including a pair of double satellite gears each having a larger diameter gear half meshing with said driving gear and a smaller diameter gear half rotatable with said larger diameter gear half and meshing with said internal gear teeth.

4,072,068

BAND SAW TEETH WORKING MACHINE

Vladimir Viktorovich Idel, ulitsa Kirova, 11, Zakarpatskaya oblast, Mukachevsky raion, selo Kolchino, U.S.S.R.

Filed Feb. 11, 1977, Ser. No. 767,784
Int. Cl.² B23D *63/04*
U.S. Cl. 76—58 **4 Claims**



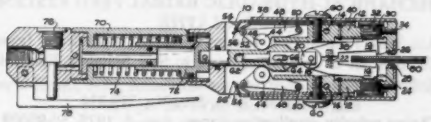
1. A machine for working the teeth of a band saw, comprising: a framework; a device for clamping a band saw by the side surfaces thereof, mounted on said framework; abtument means for the apices of the teeth of the band saw and for the back edge thereof, mounted on said device for clamping the band saw by the side surfaces thereof; a mechanism for advancing the band saw stepwise, mounted on said framework; a component of said stepwise-advancing mechanism, carrying a member adapted to cooperate with the teeth of the band saw being advanced, said component being mounted for reciprocation in a direction parallel with the direction of the advance of the band saw in the course of working the teeth of the band saw; tool means for working the teeth of the band saw, mounted on said framework and arranged after said stepwise-advancing mechanism in the direction of the advance of the band saw; an auxiliary device for clamping the band saw by the side surfaces thereof, mounted on said component of said stepwise-advancing mechanism so that said auxiliary clamping device is arranged in front of said aforementioned clamping device mounted on said framework in the direction of the advance of the band saw, adjacent to said aforementioned clamping device; abutment means for the apices of the teeth of the band saw, mounted on said auxiliary device for clamping the band saw by the side surfaces thereof; driving means for actuating said stepwise-advancing mechanism and said tool means for working the teeth of the band saw.

4,072,069

WIRE STRIPPING TOOLS

Zdzislaw Bieganski, Brushwood, Kingsbourne Green, Harpenden, Hertfordshire, England

Filed Apr. 7, 1976, Ser. No. 674,582
Claims priority, application United Kingdom, Apr. 12, 1975, 15102/75
Int. Cl.² H02G *1/12*
U.S. Cl. 81—9.5 A **2 Claims**



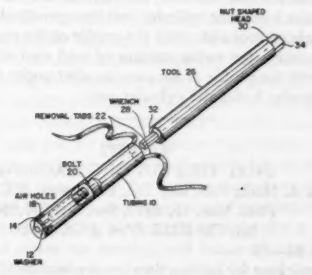
1. A wire stripping device comprising a body having a pair of gripping jaws pivoted thereon, a cylinder fixed to the body having an axially movable piston and piston rod, and a pair of cutting jaws which are pivoted to a member that has a lost motion connection with the piston rod, to permit limited initial motion of the piston rod relative to said member, wherein the improvement comprises a cam mounted on the piston rod and having a first jaw-closing surface, a second dwell surface to hold the gripping jaws closed, and a third jaw-opening surface, the cutting jaws being arranged between and in driving contact with the gripping jaws for actuation by the gripping jaws, cam followers including levers pivoted on the gripping jaws, spring means urging the cutting jaws apart into said driving contact with the gripping jaws, the cam surfaces being arranged to close both pairs of jaws during initial movement of the piston rod relative to said member, to hold the gripping jaws closed during further movement of the piston carrying along said member, and to open both pairs of jaws during still further movement of the piston and member, and resilient means fixed to the gripping jaws providing resistance to said levers during movement of the piston rod.

4,072,070

REMOTE ACCESS WASHER WITH BOLT ALIGNMENT TOOL

Arthur Francis Finn, Vienna, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 17, 1976, Ser. No. 715,037
Int. Cl.² B25B *13/48*
U.S. Cl. 81—71 **3 Claims**



1. Apparatus for aligning and tightening, comprising, in combination:
a bolt;
a washer;

an alignment tube, said washer affixed to one end of said tube, said bolt inserted into said tube, the head of said bolt facing the other end of said tube; and

an extension tool having an outside diameter minutely smaller than the inside diameter of said tube, thereby permitting said tool to be inserted into and rotated within said tube, said tool being shaped at one end so as to mate with said bolt and being nut-shaped at the other end for receiving a wrench;

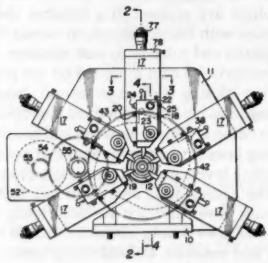
whereby said bolt and said washer may be aligned and tightened in a remote or restricted, normally inaccessible hole.

4,072,071

MECHANICAL-HYDRAULIC RADIAL FEED SYSTEM FOR A LATHE

Yukio Sato; Takeshi Itoh, both of Shizuoka, and Hiromi Izawa, Shimizu, all of Japan, assignors to Star Seimitsu Kabushiki Kaisha, Japan

Filed July 30, 1976, Ser. No. 710,114
Claims priority, application Japan, Aug. 6, 1975, 50-95008
Int. Cl.² B23B *3/00, 21/00*
U.S. Cl. 82—2 R **9 Claims**



1. For use in a lathe having a headstock for holding a workpiece in the form of wire or rod for rotation a mechanical-hydraulic radial feed system comprising, a frame, a plurality of tool slides slidably mounted in the frame and in use movable radially of a rotationally and axially driven workpiece in a lathe, the slides each having means for carrying a tool, a plurality of hydraulic cylinder units each associated with a respective one of the tool slides for driving the tool slides from an inoperative position corresponding to a retracted position and toward the workpiece to a maximum advanced position and back to the inoperative position, a hydraulic circuit for controlling the hydraulic cylinder units, a profile cam member mounted for angular movement about an axis coincident with an axis of the workpiece, means for driving the cam member rotationally, connection means normally isolating the tool slides from the cam member, but responsive to an actuation of a particular hydraulic cylinder unit for operatively connecting the associated tool slide with the profile of the cam member to profile-control the radial motion of said tool slide in accordance with the profile of the cam member under the control of the particular hydraulic cylinder unit.

4,072,072

DUAL TIRE CUTTING MACHINE

Mitchell A. Harb, P.O. Box 261, Lexington, N.C. 27292

Filed Mar. 15, 1977, Ser. No. 777,838
Int. Cl.² B23B *3/04, 3/06, 37/00*
U.S. Cl. 82—86 **11 Claims**

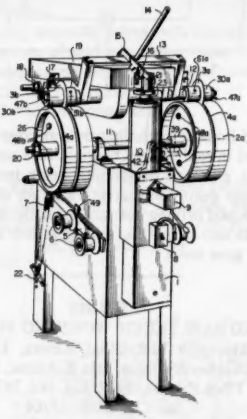
1. A machine for cutting tires into a plurality of pieces which comprises:

A. a frame;

B. a pair of wheels, vertically positioned upon the frame for receiving said tires, said wheels being opposingly positioned relative to each other and circumferentially slotted for the coactive positioning therein of circular cutting blades;

C. circular cutting blades mounted upon a first horizontal shaft, said first horizontal shaft being disposed transversely of the frame and secured to one end of a horizontal overhead beam;

D. an overhead beam, pivotally mounted on a second horizontal shaft which said second shaft is secured to the frame, said overhead beam being further pivotally connected with means, vertically mounted upon the frame for raising and lowering the end of said overhead beam so that said cutting blades may engage the circumferential slots in the cutting wheels when said overhead beam is lowered and raised;



E. horizontal tensioning bar means, pivotally mounted upon the frame at one end and connected with said overhead beam to engage the lower inside bead of a tire with a downward tensioning pressure when said overhead beam is lowered;

F. collar means adjacent either side of each said cutting blade, said collar means being of smaller diameter than said cutting blades for engaging the tread surfaces of said tires when the overhead beam is in the lower position to impart a turning motion thereto; and

G. power means connected to said first horizontal shaft for turning said shaft, collars and cutting blades.

4,072,073

MACHINE FOR CUTTING PIPE AND TUBING

Orville J. Birkestrand, 129A Casuda Canyon Drive, Monterey Park, Calif. 91754

Filed Apr. 8, 1976, Ser. No. 675,200
Int. Cl.² B23B *5/14*
U.S. Cl. 82—92 **6 Claims**

1. A machine for cutting pipe, tubing and the like, comprising:

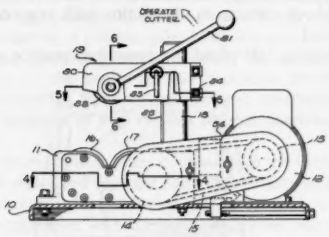
a base member and motive power means mounted thereon;

a pair of generally parallel, driven rollers rotatably mounted from said base member;

a mechanical drive arrangement mounted on said base member for coupling said motive power means to said rollers to cause said rollers to rotate synchronously in opposite rotational senses;

a cutter-head assembly including a free-wheeling cutter wheel rotatable about a shaft within said head assembly and substantially parallel to said rollers, and first means including an eccentric drive and connected hand lever for advancing said cutter against and through the work, said work, cutter and rollers all rotating when said cutter is in work contact;

and second means independent of said first means and mounted from said base member for selectively and rigidly pre-positioning said cutter-head assembly as a unit with respect to said work to provide an initial cutter position appropriate for a particular diameter of work, the range of cutter advancement required of said first means



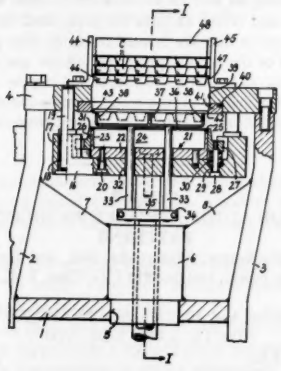
being thereby limited, said second means comprising a gear-toothed rack structurally fixed with respect to said base, and a pinion gear rotatably mounted about a shaft attached to said head assembly and associated with a second hand lever to effect said pre-positioning of said cutter-head assembly by rotation of said second lever.

4,072,074

DEVICE FOR FORMING ORDERLY ARRANGED GROUPS OF PACKAGES FROM A CONTINUOUS WEB OF PACKAGES

Andrea Romagnoli, Via Madonna dei Boschi 18, S. Lazzaro Di Savena (Province of Bologna), Italy

Filed Feb. 14, 1977, Ser. No. 768,508
Claims priority, application Italy, Feb. 13, 1976, 3335/76
Int. Cl.[2] B26D 7/06
U.S. Cl. 83—85 **4 Claims**



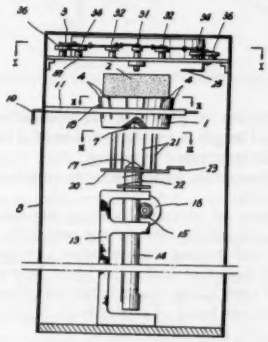
1. A device for forming orderly arranged groups of packages from a continuous web of packages, characterized in that it comprises a first stem slidably guided vertically and driven between a lowered position underlying the web and a raised position overlying the web, a support secured to the top of said stem, a punching member attached to said support and having a sidewall, said sidewall surrounding a cavity and including a border defining externally a cutting edge, a die supported such as to have a lower side substantially adhering to the upper side of the web and having an opening aligned with and complementary to the punching member, such as to permit the insertion thereof through the opening and the punching out of one package from the web during the raising movement of the punching member from said lowered position to said raised position, a second stem slidably guided parallel to the first stem and provided at the top with a plate receivable in said cavity, said stem being driven between a position wherein said plate underlies the web and a position wherein the plate overlies the web after the package punching has been completed, a stacking magazine being provided for the raised packages, said stacking magazine being located above said die and inclusive of a retaining means such that for each raised package there occurs a raising of the packages previously introduced in the magazine and the resting of the package last introduced on said retaining means.

4,072,075

CAKE CUTTER

Norio Ezaki, 3-29, Kohamahonmachi, Sumiyoshi, Osaka, Japan

Filed Apr. 28, 1976, Ser. No. 681,223
Int. Cl.[2] B26D 7/06, 3/24
U.S. Cl. 83—153 **8 Claims**

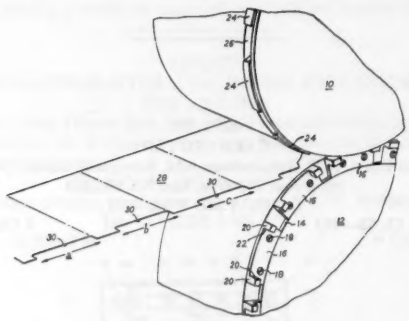


1. Apparatus for cutting cake, or the like, comprising a framework, an assembly of horizontally elongated power actuated reciprocatory cutters mounted on said framework, a removable table having an upper surface for supporting a cake and having a series of downwardly directed grooves in said surface corresponding to the arrangement of said cutters to receive said assembly of cutters therein below the level of the supporting surface, slide means mounted on said framework for initially positioning said table with an uncut cake below said cutters, and elevating means to raise said table thus positioned by said slide means to cause a cake on said table to be cut into a plurality of pieces by said cutters, said table and elevating means including registering means to automatically position the table to permit said cutters to be received in said grooves to permit the cake to slide horizontally from the surface of the table after cutting, a series of vertically extending lances mounted on said framework for vertical movement, and means for moving said lances upwardly from an initial position below a table initially positioned by said slide means through a series of aligned openings in said table into the interior of a cake on said table and for further upward movement with said table when a cake is being cut, said means for moving said lances including stop means for limiting said upward movement of the lances to prevent projection of said lances above the level of the supporting surface of the table after a cake has been cut, said means for moving said lances also including a vertically reciprocable element supported by said framework for detachable engagement with the underside of said table for raising said table from said slide means for cutting a cake and for lowering the table to said slide means after a cake has been removed, said series of lances being mounted on said elements for movement with said element.

4,072,076
PUNCHING APPARATUS

Geoffrey Robert Henry Miles, Kettering, England, assignor to Timsons Limited, Kettering, England

Filed Nov. 10, 1976, Ser. No. 740,545
Claims priority, application United Kingdom, Nov. 11, 1975, 46458/75
Int. Cl.[2] B26D 1/56
U.S. Cl. 83—300 6 Claims



1. An apparatus for punching out a plurality of notches of predetermined length in an edge portion of at least one travelling web, said apparatus comprising:

a. a pair of rotatable wheels between which said at least one web passes,

b. a plurality of segmental cutting elements arranged in spaced relationship around the periphery of one of the wheels, each cutting element being a bridge-shaped member with a pair of limbs, the space between the pair of limbs of each bridge-shaped member of each of said cutting elements being of successively respectively decreasing lengths, and

c. a plurality of cutting punches arranged in spaced relationship around the periphery of the other wheel, each of the cutting punches being of a size and arranged to fit within the space between a pair of limbs of a respective bridge-shaped member to engage its limbs and to produce a scissor-like action so as, in use, to punch out notches from said at least one web between the wheels.

4,072,077
PRINTED CIRCUIT BOARD PROTECTOR

John H. Morgan, Albuquerque, N. Mex., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

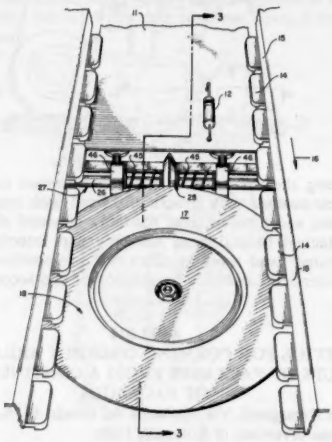
Filed May 24, 1976, Ser. No. 689,444
Int. Cl.[2] B23D 33/02; B26D 7/06
U.S. Cl. 83—418 31 Claims

1. In equipment for trimming component leads protruding from one side of a printed circuit board to a prescribed length when measured from the one side of a flat circuit board that is in a first plane, the equipment including a flat cutting disk arranged for rotation about an axis perpendicular to the first plane and having one surface adjacent to the first plane and being in a second plane that is parallel to and spaced from the first plane a prescribed distance that is equal to the prescribed length, and first means for moving circuit boards over the disk with at least a portion of edges of the one side of the board in the first plane and component leads projecting away from the one side of the circuit board in the direction of the second plane, the IMPROVEMENT comprising:

a wheel having an axis of rotation, a pair of sides, a circumferential outer edge, and having a thickness that is variable and which decreases in magnitude in the direction of the circumference of said wheel over at least a portion of the length of the radius thereof;

means rotatably supporting said wheel in front of the cutting disk in the direction of movement of circuit boards and for rotation in the same direction, said wheel being supported with a point on the circumference thereof located in the first plane, the remainder of said wheel being located on the side of the first plane that is in the direction of the second plane; a transverse force in the direction of the axis of rotation of said wheel being produced thereon when said wheel contacts an obstruction such as a component lead; and

means holding said wheel in a prescribed position along the

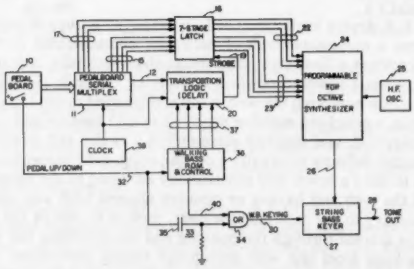


axis of rotation thereof when transverse force on said wheel in the direction of the axis thereof is less than a prescribed force and allowing lateral movement of said wheel along its axis of rotation only when a transverse force on said wheel exceeds the prescribed force; moving circuit boards that are bowed from the first plane in the direction of the second plane having the one side thereof contacting said wheel as the board moves over it for causing said wheel to rotate and to raise the one side of a bowed circuit board above the leading edge of the cutting disk.

4,072,078
SYSTEM FOR AUTOMATICALLY PRODUCING TONE PATTERNS

Larry R. Shallenberger, Mishawaka, Ind., and James S. Southard, Union, Mich., assignors to C.G. Conn, Ltd., Oak Brook, Ill.

Filed Apr. 19, 1976, Ser. No. 677,975
Int. Cl.[2] G10H 1/00, 5/00
U.S. Cl. 84—1.03 13 Claims



1. A tone pattern generating system for use with an electronic musical instrument including, in combination:

a continuously running clock means for producing clock output pulses on an output thereof at a predetermined frequency;

rhythm pattern generating circuit means coupled with said clock means for producing at least one predetermined rhythm pattern for use in said musical instrument;

downbeat divider circuit means having an output, and having an input coupled with the output of said clock means and reset by a predetermined rhythm pattern from said rhythm pattern generating means to produce output pulses on the output of said downbeat divider circuit corresponding to downbeat measures synchronized with the operation of said rhythm pattern generating means; and

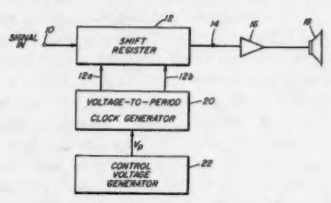
tone pattern control means coupled with the output of said clock means and with the output of said downbeat divider circuit means for producing predetermined tone patterns in synchronism with the downbeat pulses obtained from said downbeat divider circuit means.

4,072,079

APPARATUS AND METHOD FOR MODIFYING A MUSICAL TONE TO PRODUCE CELESTE AND OTHER EFFECTS

Paul H. Sharp, South Pasadena, Calif., assignor to CBS Inc., New York, N.Y.

Filed Aug. 9, 1976, Ser. No. 713,008
Int. Cl.[2] G10H *1/04*
U.S. Cl. 84—1.24 **14 Claims**



1. In an electric musical instrument, apparatus for electronically modifying sound derived from a source in which the sound is in the form of an audio frequency electrical signal, the combination of:

shift register means having an input terminal connected to receive an audio frequency electrical signal from said source and an output terminal,

a first clock generator coupled to said shift register means operative to generate a train of clock pulses the period of which is controllable in direct proportion to a control voltage applied to said clock generator, said clock pulses being applied to said shift register means for controlling the shifting of sampled representations of said audio frequency electrical signal through the shift register means to produce at said output terminal a delayed electrical analog representation of said audio frequency electrical signal, and

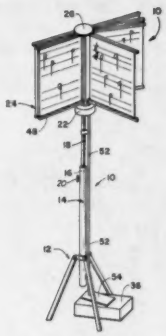
means for applying a sub-audio frequency control voltage to said first clock generator thereby to vary the period of said train of clock pulses at said sub-audio frequency rate, whereby a delayed frequency-modulated electrical analog representation of said input audio frequency electrical signal differing in frequency therefrom by an amount determined by the rate of change in amplitude of said sub-audio frequency control voltage is produced at said output terminal.

4,072,080

SHEET MUSIC PAGE TURNING DEVICE

Daniel Conlin, 810 Cornwall Ave., P.O. Box No. 5, Fort Frances, Ontario, Canada

Filed Feb. 20, 1976, Ser. No. 659,671
Int. Cl.[2] G10G *7/00*
U.S. Cl. 84—486 **6 Claims**



1. A sheet music page turning device comprising in combination:

a base support member;

a verticalshaft carried by said base;

an annular guide track comprising a single circumferentially extending inverted U-shaped channel member mounted coaxially upon said vertical shaft and adapted to support a plurality of page holder elements movably thereon;

a plurality of spring-biased sleeve members mounted rotatably in superposed relation on said shaft;

a plurality of page holder elements supported within said channel member for movement therewithin;

a plurality of radial connecting arms secured to consecutively arranged ones of said sleeves and to consecutively arranged ones of said page holder elements whereby rotation of said sleeves serially results in the serial movement of said page holder elements within said channel member;

a foot pedal pivotably mounted on a pedal support member, a generally vertically extending slide rod connected to the free end of said foot pedal and provided with a retainer pin at the upper end thereof dimensioned to project slidably within an aligned aperture in said channel member into the path of movement of said page holder elements;

and spring means for normally biasing said slide rod upwardly such that said retainer pin projects through the said aperture in said channel member to prevent advancement of the formost of said page holder elements.

4,072,081

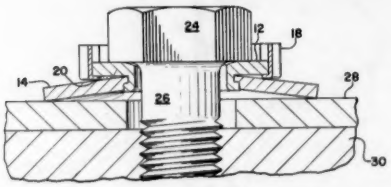
TENSION INDICATING WASHER UNIT

Gary Martin Curtis, Elgin, and David Prugh Wagner, Geneva, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Continuation of Ser. No. 632,135, Nov. 14, 1975, abandoned.
This application June 6, 1977, Ser. No. 803,707
Int. Cl.[2] F16B *31/02*
U.S. Cl. 85—62 **10 Claims**

1. A multipiece, preassembled washer unit comprising at least two superimposed, coaxial washer members, means interconnecting the washer members from relative axial movement, the bottommost of said washer members being a cone-like spring device, a ring gauge member interposed between at least the outer marginal regions of the superimposed washer members, the ring gauge comprising a radially extending flange portion retaining the gauge on the unit and adapted to be pinched between the outer marginal regions of the washer members, the gauge further including side wall portions extending generally perpendicularly of the flange to surround

and locate the gauge relative to the uppermost of the superimposed washer members, the side wall portions comprising vertical corrugations about the entire periphery consisting of a plurality of V-shaped wall sections with the apices of said sections extending substantially parallel to the axis of the fastener and extending from the uppermost edge of the side wall to the flange the apices of said vertical corrugations being closely spaced from each other and contacting the outer periphery of the uppermost washer thereby providing a means for laterally sizing the gauge on the uppermost washer and for eliminating free lateral movement of the radially extending flange of the gauge relative to said washer, said plurality of



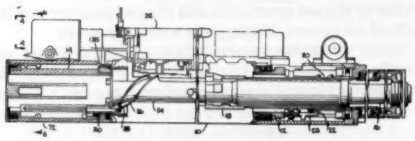
V-shaped wall sections being directly interconnected to one another at apices on the outer surface of said wall, said outer surface thus being provided with external grasping means for said gauge, wherein the unit may be associated with a rotary threaded fastener member in such a manner as to simultaneously provide spring take-up capabilities to a fastened joint while providing an indication of the attainment of a predetermined tension level in the joint when the conical spring member has been compressed an amount directly relatable to the predetermined tension level, said indication being the pinching of the ring gauge between the washer members to restrain the gauge from free rotation relative to the washer members.

4,072,082

RECOIL CONVERTER

P. A. Bates, Essex Junction; L. R. Folsom, Williston, and A. J. Haberstroh, North Hero, all of Vt., assignors to General Electric Company, Burlington, Vt.

Filed Nov. 4, 1974, Ser. No. 520,858
Int. Cl.² F41D *5/02*
U.S. Cl. 89—162 **11 Claims**



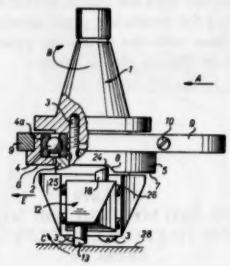
1. A gun comprising:
a stationary gun mount;
a gun housing journaled for reciprocation relative to said gun mount;
an operating mechanism carried by said housing;
an energy absorbtion and return mechanism coupled to said gun mount, said gun housing and said operating mechanism for absorbing and storing energy from the recoil movement of said housing relative to said gun mount, and for transmitting energy to said operating mechanism subsequent to said recoil movement;
a gun bolt coupled to said operating mechanism;
a gun barrel coupled to said operating mechanism;
said gun having a gun cycle from 0° to 360°;
said housing recoiling from 0° to 180°, and counter-recoiling from 180° to 360° of said gun cycle;
said gun barrel recoiling from 0° to 90°, and counterrecoiling from 90° to 180° of said gun cycle; and
said energy absorbtion and return mechanism absorbing energy from 0° to 180°, and transmitting energy to said operating mechanism from 180° to 360° of said gun cycle.

4,072,083

MILLING HEAD

Jiri Cesal, Kaiserstuhlstr. 57, Oberglatt, Switzerland (8154)

Filed Oct. 12, 1976, Ser. No. 731,360
Claims priority, application Switzerland, Nov. 6, 1975, 14469/75
Int. Cl.² B23C *5/26*; B23D *5/00*
U.S. Cl. 90—11 A **10 Claims**



1. A milling head comprising a shaft means for attachment to a machine tool, said shaft means defining a rotational axis, a tiltable holder means adapted to retain cutting means and defining a tilting axis extending perpendicularly to said rotational axis of said shaft means and mounting means operatively mounting said holder means relative to said shaft means so as to swivel said holder means along a portion of each revolution of the milling head means whereby the cutting means is lifted off from the surface to be machined, and in another portion of each revolution of the milling head means is engaging the surface to be machined, said mounting means further comprising camming means operatively associated with said holder means and with said mounting means, said camming means comprising a cam plate, and a cam follower means mounted relative to said cam plate for imparting said swivel motion of said holder means relative to said mounting means.

4,072,084

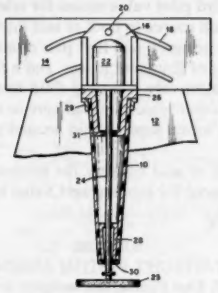
GRAPHITE FIBER REINFORCED STRUCTURE FOR SUPPORTING MACHINE TOOLS

Charles E. Knight, Jr., Knoxville; Louis Kovach, Oak Ridge, and John S. Hurst, Knoxville, all of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Dec. 17, 1976, Ser. No. 751,622
Int. Cl.² B23B *47/00*; B23C *5/28*; B24B *45/00*
U.S. Cl. 90—11 A **6 Claims**

1. In combination with a machine tool comprising a machine tool housing and a tool support carried by said housing for supporting a tool in a desired working relationship with a workpiece, said tool support comprising a hollow elongated tubular body formed of a plurality of layers of graphite fibers with the layers and fibers in each layer bonded together with a resin binder, the fibers in the majority of said layers being disposed in a side-by-side relationship and oriented so as to extend along a plane projecting between opposite ends of the tubular body, the fibers in the minority layers being wound

about the tubular body in a side-by-side relationship and projecting in a plane orthogonal to the fibers in the first-mentioned



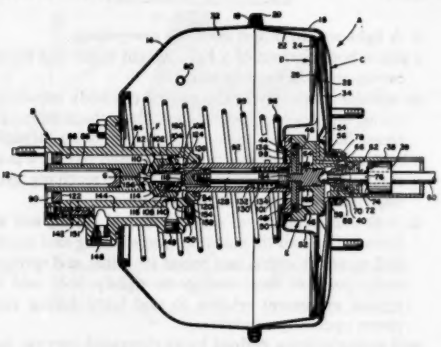
plane, each of the minority of the layers being separated from one another by a plurality of the majority of the layers.

4,072,085

COMBINED HYDRAULIC AND VACUUM BOOSTER

Thomas R. Soupal, Owosso, Mich., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Sept. 26, 1975, Ser. No. 617,199
Int. Cl.[2] F15B *11/20, 13/07*
U.S. Cl. 91—413 **5 Claims**



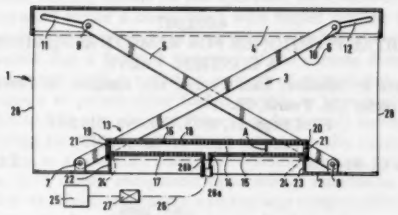
1. A combined hydraulic and vacuum booster comprising; series connected hydraulic and vacuum boosters having valve means for operating same and including a common force output member, common operating means for operating said valve means and energizing said boosters in sequence for first applying substantially the full force of said hydraulic booster to said output member while said vacuum booster is substantially inoperative and then applying the force of said vacuum booster to said output member, said hydraulic booster including a piston and said valve means including a normally open hydraulic valve for bypassing hydraulic fluid from one side to the other of said piston, said operating means being operative to first close said hydraulic valve and then momentarily operate said valve means to energize said vacuum booster with substantially less than its full force potential so that said vacuum booster simply follows said hydraulic booster without supplying any significant force to said force output member until substantially the full force of said hydraulic booster is applied to said force output member whereupon said valve means is operated to energize said vacuum booster to substantially its full force potential.

4,072,086

DRIVING ASSEMBLY

Karl Signar Nordlund, Bjarshog, 212 90 Malmo, and Kjell Berglund, Revingevagen 4, 240 35 Harlosa, both of Sweden

Filed Feb. 10, 1976, Ser. No. 656,792
Claims priority, application Sweden, Feb. 10, 1975, 7501416
Int. Cl.[2] F15B *11/08;* F01B *19/00*
U.S. Cl. 91—418 **11 Claims**



1. A driving assembly comprising:

a. a first unit having a portion with the form of a first open container, a bottom wall of which defines a first bladder bearing surface, said first container having a first container side wall extending from the peripheral portion of said bottom wall, said side wall, together with said first container bottom wall, defines a first cavity, said first container being open on the end opposite said first container bottom wall;

b. a second unit having a portion with the form of a second, open container, a bottom wall of which defines a second bladder bearing surface, said second container having a second container side wall extending from the peripheral portion of said second unit bottom wall, said second container side wall together with said second container bottom wall defines a second cavity, said second container being open on the end opposite said second container bottom wall, said second container being disposed within the cavity of said first container in telescopic, nested relationship therewith so that said first and second bearing surfaces are in opposed, spaced relationship, said first unit being movable relative to said second unit;

c. an expansible bladder engaging said first and second units and disposed therebetween, said bladder having an outer surface area and an inner expansible chamber; said bladder having a pair of opposite end wall portions comprising the major portion of said outer surface area of said bladder; the remaining outer surface area being defined by a side wall portion of said bladder at least when said container is in a pressurized condition;

d. means connected with said bladder for effecting communication with a pressure source, the shape of said bladder being changeable in response to a change in fluid pressure in said bladder to move said first unit with respect to said second unit, said communication means passing through said second bearing surface of said second unit and into said second container cavity, whereby said second container provides space for and protection for said communication means;

e. said first container side wall and said first and second container bottom walls defining an enclosed area within which said bladder is entirely disposed;

f. said bladder fully engaging the side of said second container bottom wall which faces away from said second container cavity, said bladder being disposed entirely outside said second container cavity, said bladder fully engaging the side of said first container bottom wall which faces toward said first container cavity of said first container, said bladder being disposed entirely within said first container cavity;

g. the entirety of said first container side wall being disposed in parallel relationship with the entirety of said second

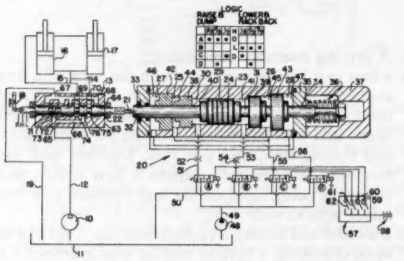
container side wall, the major portions of the first and second container side walls overlapping each other in face-to-face relationship when said bladder is in the depressurized condition, said first and second container side walls being movable relative to each other when the pressure in said bladder increases, said first and second container side walls cooperating with each other during such movement to guide and stabilize the movement of said first unit relative to said second unit.

4,072,087

DIGITAL POSITIONER FOR REMOTE ACTUATION OF A CONTROL VALVE

James P. Mueller, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 17, 1975, Ser. No. 614,047
Int. Cl.² F15B *11/08, 13/043*
U.S. Cl. 91—461 **5 Claims**



1. A hydraulic system having a remotely controlled positioner for a hydraulic control valve for fluid-operated mechanism, comprising:

an inlet and exhaust hydraulic control valve wherein said valve has a spool reciprocably mounted within a cylindrical valve bore and which is movable to intermediate positions between fully open and fully closed positions for controlling the flow of fluid between an inlet and an outlet of said valve;

a positioner housing having a cylindrical bore, said bore having a central region and a pair of intermediate regions each adjacent an opposite end of said central region and further having a pair of outer regions each adjacent a separate one of said intermediate regions;

a double acting piston reciprocably mounted in said central region of said bore and having a rod extending axially from said bore through said opposite regions of said positioner housing and spring means associated with said positioner for biasing said piston towards a central position in said central region of said bore;

a first pair of movable fluid-controlled stop means each being disposed in a separate one of said intermediate regions of said bore for axial movement therein, and a second pair of movable fluid controlled stop means, each being disposed in a separate one of said outer regions of said bore for axial movement therein wherein the face areas of each of said stop means exceed the face area of said double-acting piston;

a first pair of abutment means each being situated between said central region of said bore and a separate one of said intermediate regions thereof for limiting movement of said first pair of stop means towards said central region of said bore, and a second pair of abutment means each being situated between a separate one of said outer regions of said bore and the adjacent one of said intermediate regions thereof for limiting movement of said second pair of stop means towards said intermediate regions of said bore;

a source of pilot fluid;

a first pilot valve means for selectively directing fluid from said source to one end of said central region of said bore for moving said piston towards the other end thereof, a second pilot valve means for selctively directing fluid from said source to said other end of said central region of said bore for moving said piston towards said one end thereof, a third pilot valve means for selectively directing fluid from said source to both of said intermediate regions of said bore to move said first pair of stop means against said first pair of abutment means, and a fourth pilot valve means for selectively directing fluid from said source to both of said outer regions of said bore to move said second pair of stop means against said second pair of abutment means, and

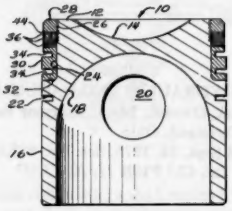
means external of said housing for connecting said rod to said valve spool for moving said valve to said positions.

4,072,088

LIGHT-WEIGHT PISTON ASSEMBLIES

Alexander Goloff, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed June 25, 1976, Ser. No. 699,759
Int. Cl.² F16J *1/00*
U.S. Cl. 92—220 **4 Claims**



1. A light-weight piston assembly comprising:

a piston body formed of a light-weight metal and having a crown and a depending skirt;

an annular recess about the end of the body adjacent the crown and opening toward the crown, the portion of said recess immediately adjacent the crown being threaded;

a hard metal ring groove protection band having a peripheral, radially outwardly opening ring receiving groove disposed with a press fit in said recess;

at least one annular wavy spring in said recess; and a nut threaded on said threaded portion securing said band and said spring(s) within said recess such that said spring(s) is compressed to store energy to tightly hold said band against movement relative to said body during various piston operating conditions;

said spring(s) being defined by an elongated, narrow, metallic strip having its ends butt welded together to form an annular structure.

4,072,089

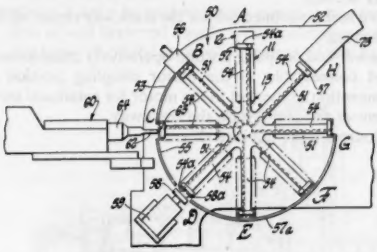
TWO STATION SONIC SEALING APPARATUS AND METHOD

Eugene R. Bosche, Plymouth, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.

Filed May 26, 1976, Ser. No. 690,221
Int. Cl.² B31B *1/66*
U.S. Cl. 93—44.1 GT **26 Claims**

14. A method of forming a seal between layers of thermoplastic coated paperboard material and the like, said method comprising the steps of: clamping the layers between the opposed work surfaces of a vibrating horn and a back-up means for a predetermined period of time sufficient to cause the thermoplastic material to be thermally activated by the frictional heat generated by the vibrating horn; unclamping the layers from between the work surfaces of said horn and back-up means while the thermoplastic material is still in its activated state; moving the layers with the activated thermoplastic material to another location; and clamping the layers between

opposed work surfaces at said another location for a predetermined period of time sufficient to permit the thermoplastic material to cool and set and form a seal between the layers.



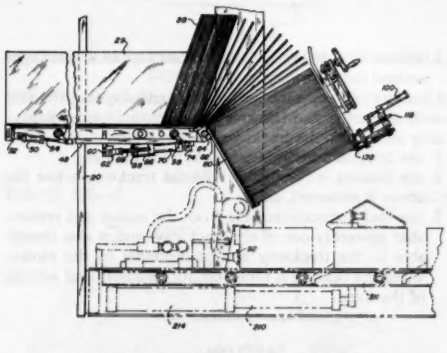
26. Apparatus as claimed in claim 1 including preclosing means spaced from said activating station for pressing the layers to be sealed to their closed condition prior to movement of the layers to said activating station.

4,072,090

APPARATUS AND METHOD FOR AUTOMATICALLY FEEDING AND ERECTING FOLDED CARTONS

Raymond A. Heisler, 657 Dakota Trail, Franklin Lakes, N.J. 07417

Filed June 21, 1976, Ser. No. 698,401
Int. Cl.[2] B31B *1/80*
U.S. Cl. 93—53 M **20 Claims**



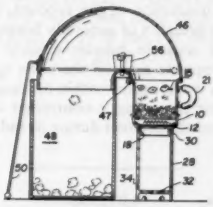
1. Apparatus for receiving, transporting and presenting for withdrawal and the erection of folded cartons for use in case packing apparatus and the like, said apparatus including: (a) a fixed frame including side guides providing a support surface for receiving and maintaining folded cartons in a substantially side-by-side condition; (b) a reciprocating frame movable in a rectangular pattern and within the fixed frame, the movement including a vertically movable portion bringing the frame into a lifting engagement of at least one-eighth of an inch of the reciprocating frame above the fixed frame with at least a substantial portion of the folded cartons carried forwardly with a forward movement of the reciprocable frame, the movement pattern further including a lowering of the frame, of at least one-eighth of an inch of the reciprocating frame below the fixed frame to bring the frame below the support surface of the fixed frame and during this lowered movement the reciprocable frame is moved rearwardly, the reciprocating frame carried by a pair of axles having eccentrically formed ends which provide an eccentric motion of at least one-eighth inch throw and with antifriction rollers mounted on these ends, said rollers carrying the reciprocable frame on portions of the fixed frame so that when movable therealong the movable frame is moved in a path substantially parallel to the carton support surface provided by the fixed frame, and there is additionally provided means for simultaneously rotating the axles so that the eccentric ends at one limit of rotation of the axles are raised sufficiently to cause the rollers to lift the reciprocable frame and its carton support surface and at the other limit of rotation the axles are repositioned so that the eccentrically mounted rollers lower the carton support surface of the reciprocable frame below the carton support surface of the fixed frame; (c) means for moving the reciprocable frame forwardly and rearwardly with and by actuation of a hydraulic cylinder and there is provided limiting means on the hydraulic force whereby on the forward stroke a chute filled with folded cartons overcomes the propulsive force of the cylinder which is inhibited to the extent that a forward transport of the cartons does not occur as and until a sufficient amount of cartons has been withdrawn to permit other folded cartons to be moved forwardly to take the place of those withdrawn; (d) means for delivering the folded cartons from their vertically supported condition to a generally horizontal condition in said delivery chute; (e) a carton escapement apparatus in association with the delivery chute and having a carton stop reciprocably actuated by a single means whereat in one limit of movement this stop supports an outer edge of the lowermost carton in the horizontally disposed stack of folded cartons and when this carton stop is moved to and near its other limit of movement the engaged edge of the lowermost carton is released for removing from the stack and in a timed association with this movement of the carton stop there is provided an intermediate wedge-shaped entering blade which is moved counterflow to the movement of the carton stop, said blade movably disposed to enter that space between the lowermost carton and the next above carton as and with a sufficient time interval occurring before the carton stop is withdrawn from the stack supporting condition, and during the time the carton stop is withdrawn from supporting condition to support this immediately above and those additional above folded cartons, and (f) means for advancing the wedge-shaped entering blade a determined distance in from the edge of the folded carton to insure that the variations in carton construction are overcome and the entering blade positively engages the edge of the folded carton.

4,072,091

PORTABLE ELECTRIC HEATING DEVICE FOR POPPING CORN

Victor M. Richardson, Brocton, N.Y., assignor to The Raymond Lee Organization, Inc., a part interest

Filed Aug. 31, 1976, Ser. No. 719,173
Int. Cl.[2] A23L *1/18*
U.S. Cl. 99—323.5 **6 Claims**



1. A portable heating device for popping corn comprising:
a cup shaped member containing an electric heating element disposed intermediate a top relatively large diameter round open end having an internal thread and a bottom relatively small diameter round closed end having an external thread, the element being insulated from the member;
an electrical connector secured to the outside of the cup and connected electrically to said element;
a vertical cylindrical shaped sleeve, open at its top end and having a bottom end threadedly engaging the top end of the member;

a vertically flexible hollow cylinder disposed along side of the member and sleeve, the bottom end of the cylinder being closed, the top end being open; and

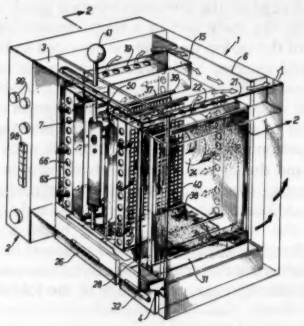
a hollow deflector chute extending between the sleeve and the cylinder, the chute having two spaced open ends, one open end of the chute being connected to the top end of the sleeve, the other open end of the chute being connected to the top end of the cylinder whereby when the sleeve is filled with popcorn and the element is heated, corn is popped and passes through the chute into the container.

4,072,092

METHOD OF AND AN APPARATUS FOR PREPARING A FOOD PRODUCT

Martti Ilmari Köhli, Stenhamra; Fjalar Ernst Erik Eklund, Danderyd, and Bo Allan Callerhorn, Upplands Vasby, all of Sweden, assignors to Concordia Development AB, Sollentuna, Sweden

Filed Mar. 23, 1976, Ser. No. 669,628
Claims priority, application Sweden, Mar. 25, 1975, 75034744
Int. Cl.[2] A47J *37/08;* A23L *3/00*
U.S. Cl. 99—389 **12 Claims**



1. An apparatus for cooking a food product of meat, fish or the like comprising an oven defining an oven space and including holding means for holding the product to be cooked in the oven space, and IR-radiating means for IR-radiation of the product in this oven space, said holding means including means for holding the product vertically in the oven space, said IR-radiating means being arranged at two opposite sides of the oven space on opposite sides of the holding means for simultaneous two-sided irradiation of the product, said IR-radiating means including a plurality of generally horizontally extending vertically spaced separate tubular electric IR-elements arranged on said opposite sides of the oven space for emitting IR-radiation with wavelengths within the range of 0.7 to 5 μm, and fan means for providing a controlled air flow directed downwards around the product during its radiation in the oven space.

4,072,093

ROTARY FOOD OVEN

Elvis Simon Zimmer, Cedar, and David Allen Hassell, Coon Rapids, both of Minn., assignors to Jeno F. Paulucci, Duluth, Minn.

Filed Apr. 2, 1976, Ser. No. 672,849
Int. Cl.[2] A47J *37/06*
U.S. Cl. 99—443 R **41 Claims**

1. A rotary food heating oven comprising:

a. an insulated base;

b. an insulated cover removably sitting upon the base and forming together with the base a heatable oven chamber;

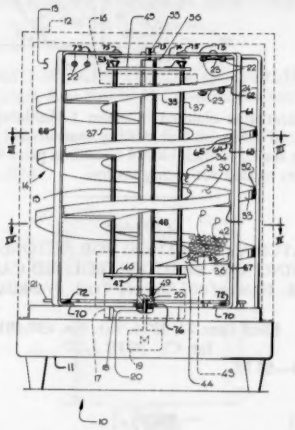
c. an upright vertical axis annular trackway in the oven chamber for supporting food packages thereon, the trackway having an open center section and being secured to the base;

d. a motor mounted in the base and having a drive coupling portion operatively accessible from within the trackway center section;

e. a drive reel positioned within the trackway center section and having

1. a lower end coupling portion operatively complemental and connectable to the motor coupling portion for connection of the reel to the motor for rotational movement of the reel within the trackway,

2. a journal at its upper end, and



3. means for engaging and advancing food packages around the trackway; and

f. a bearing engaging the reel journal and aligning the reel with respect to the trackway, the bearing being removably secured to the trackway; and in which

1. the cover is liftably removable from the base,

2. the bearing is removable fromthe trackway when the cover is removed, and

3. the reel is disconnectable from the motor and removable upwardly out of the trackway, and is also installable in the trackway and connectable to the motor, when the bearing is removed, for assembly and service of the oven.

4,072,094

METHOD FOR BUNDLING FIREWOOD

Stephen N. Smitherman, Loveland, and Lemuel A. Dougherty, Longmont, both of Colo., assignors to Big Elk Wood Corporation, Steamboat Village, Colo.

Division of Ser. No. 513,006, Oct. 7, 1974, Pat. No. 3,939,762.
This application Jan. 12, 1976, Ser. No. 648,618
Int. Cl.[2] B65B *13/04*
U.S. Cl. 100—3 **12 Claims**

1. A method for bundling firewood, said method comprising:

providing an assembly having first and second sections at a predetermined work area with one of said sections being movable toward and away from the other of said sections, each of said sections having spaced portions engageable with only the outer portions of pieces of firewood to be bundled at said work area;

placing a plurality of pieces of firewood between said first and second sections at said predetermined work area;

providing a control system including an electrical system;

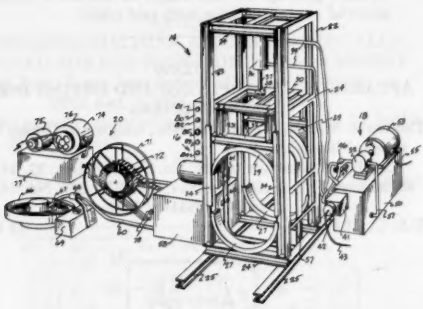
providing actuating means controlled by said control system for causing movement of said one section toward and away from said other section;

applying a multi-ton pressure to only the outer end portions of said pieces of firewood while at said work area by said

actuating means causing movement of said one section toward said other section to compress said work pieces into a bundle having a predetermined configuration;

providing a strapping means at said work area controlled by said control system;

applying a strap by said strapping means to the middle portion of said firewood bundle while maintaining said multiton pressure on the outer end portions of said bundle; and



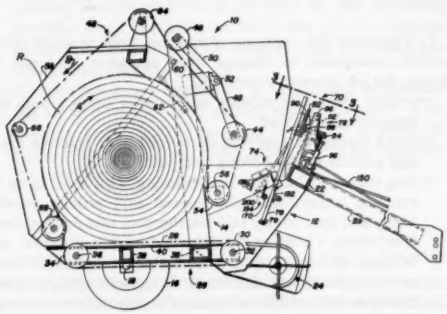
releasing the pressure on the outer end portions of said bundle by said actuating means causing movement of said one section away from said other section after said strap has been applied to said bundle so that the bundle is thereafter maintained compressed by only the strap in a tight bundle.

4,072,095

TWINE WRAPPING MECHANISM FOR A ROLL FORMING MACHINE

Willis R. Campbell, Ephrata, and Thomas W. Waldrop, New Holland, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Aug. 30, 1976, Ser. No. 718,711
Int. Cl.² B65B *13/20*
U.S. Cl. 100—5 **9 Claims**



1. A roll forming machine for crop materials comprising:

a. a mobile frame;

b. means on said frame defining a roll forming region;

c. a dispensing mechanism for feeding wrapping material in a predetermined path across said roll forming region, said dispensing mechanism including a dispensing tube;

d. a support means rigidly fixed to said frame; and

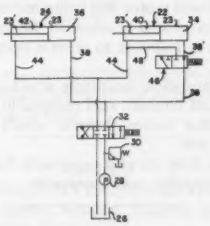
e. mounting means selectively movably connecting said dispensing mechanism to said support means, said mounting means including a gear segmented plate rigidly supporting said dispensing tube, and a shaft member interconnecting said plate and said support means whereby upon rotation of said plate by the movement of said gear segment by either a manually actuated component or rotation of said shaft by a power motor component said dispensing tube moves in a predetermined path to dispense the wrapping material across said roll forming region.

4,072,096

BALER GATE HYDRAULIC LOCK

Carmen S. Phillips, Memphis, Tenn., assignor to International Harvester Company, Chicago, Ill.

Filed Aug. 2, 1976, Ser. No. 710,944
Int. Cl.² B30B *15/28, 5/06*
U.S. Cl. 100—53 **4 Claims**



1. In a baler including a gate hydraulically raisable to release a bale, a hydraulic system for actuating and selectively locking the gate comprising:

a source of hydraulic pressure fluid;

a hydraulic cylinder on the baler operable upon actuation to raise the gate;

conduit means hydraulically interconnecting said source with said cylinder;

a flow control valve in said conduit means manually operable to direct pressure fluid into said system to selectively raise the gate;

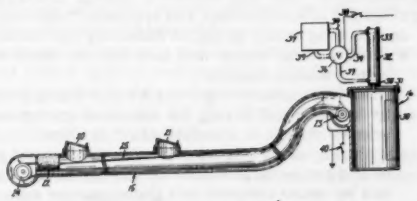
and a manual selector valve in said conduit means interposed between said cylinder and said control valve operable to block actuating fluid flow to and from said cylinder, whereby said gate may be hydraulically locked in a raised position, said selector valve including means for permitting pressure fluid to flow therethrough back to said source when disposed in said flow-blocking relation, whereby inadvertent operation of said control valve will not cause the gate to move from its locked position.

4,072,097

LITTER DISPOSAL DEVICE FOR AUTOMOBILES

Arthur H. Seibel, Rte. No. 3, Red Lake Falls, Minn. 56750

Filed June 18, 1976, Ser. No. 697,471
Int. Cl.² B30B *15/30*
U.S. Cl. 100—100 **3 Claims**



1. A litter disposal system for vehicles, comprising:

a. a conveyor conduit carried by said automobile along the underside thereof which includes at least one access port thereon for communication between the interior of said automobile and the interior of said conduit;

b. a pulley wheel mounted at the forward end of said conduit, said pulley wheel being axially rotational therein;

c. a motor means operably engageable with said conduit at the rear thereof, said motor means being an automatically reversible type electrical motor, and which includes a rotationally operable wheel means thereon;

d. a tension cable which is operably engageable with said wheel means on said motor and said pulley wheel at forward end of said conduit, said tension cable being formed of a relatively flexible material;

e. a wiper plug carried by said cable within said conduit and being sized such that it substantially covers the internal cross-sectional area of said conduit, said wiper plug thereby being movable from the forward end of said conduit to the rearward end of said conduit in response to operation of said motor and being movable from the rearward portion of said conduit to the forward portion of said conduit in response to reverse operation of said motor;

f. a litter accumulation receptacle attached to the rearward portion of said conduit, said receptacle including:

i. a compactor means thereon which is independently operable; and

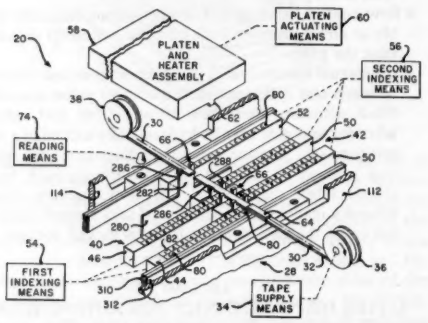
ii. an access door on said receptacle for removal of said litter from within said receptacle.

4,072,098

METHOD AND APPARATUS FOR EMBOSSING DIFFRACTION GRATINGS ON A RECORD MEDIUM

Robert H. Granzow, Miamisburg, and Richard P. Marvin, West Carrollton, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Sept. 27, 1976, Ser. No. 727,111
Int. Cl.[2] B44C *1/24*
U.S. Cl. 101—32 **12 Claims**



1. An apparatus for producing diffraction gratings on a length of reflective deformable material in conformance with a predetermined code, said diffraction gratings including data gratings and control gratings, said apparatus comprising:

an embossing station having an embossing line thereat;

a plurality of bar means, with each said bar means having grating masters thereon;

each said bar means having a length which is long in relation to its width and having the associated grating masters oriented thereon in a predetermined direction;

said plurality of bar means including first and second groups of said bar means in which said grating masters on each said bar means comprise data grating masters and control grating masters which are aligned along the length of the associated bar means with one control grating master being in side by side relationship with each said data grating master;

means for indexing said first and second groups of bar means in opposed advancing and receding relationship to each other and in a direction which is perpendicular to said embossing line so as to position selected ones of said grating masters at said embossing line so that one of said control grating masters is positioned between each two successive said data grating masters at said embossing line;

means for indexing a length of said reflective deformable material along said embossing line; and

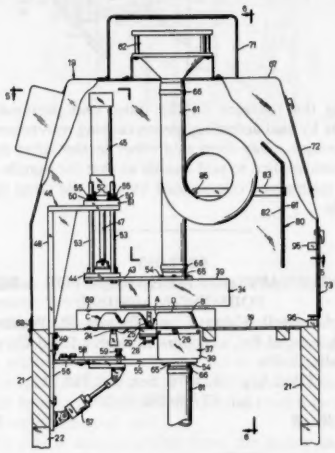
platen means including a platen for each said bar means for forcing said length of reflective deformable material into engagement with the grating masters which are selectively positioned at said embossing line to form said diffraction gratings on said length of reflective deformable material in conformance with said code.

4,072,099

APPARATUS FOR APPLYING AND DRYING INK ON CONTAINERS

Thomas R. Martin, Milwaukee, Wis., assignor to Condes Corporation, Milwaukee, Wis.

Continuation-in-part of Ser. No. 640,012, Dec. 12, 1975, abandoned. This application Nov. 24, 1976, Ser. No. 744,812
Int. Cl.[2] B41F *17/00*
U.S. Cl. 101—44 **13 Claims**



1. Apparatus for applying ultraviolet light reactive ink to articles susceptible to damage from excessive heat and for drying the ink thereon comprising:

conveyor means for moving said articles along a path at a predetermined speed;

printing means for applying ultraviolet light reactive ink to said articles moving along said path;

drying means including a heat-emitting ultraviolet lamp for emitting ultraviolet light toward said articles moving along said path to dry said ink thereon, said drying means comprising a housing wherein said lamp is disposed, said housing having an access door thereon and a deflector mounted therein, said deflector being selectively movable between one position wherein it is disposed between said lamp and said path of movement and another position wherein it is removed from between said lamp and said path;

lamp moving means for moving said lamp between a position near said articles and a position farther away from said articles, said lamp remaining illuminated and effecting drying of ink in both positions;

and control means responsive to the speed of said articles past said lamp to operate said lamp moving means to maintain said lamp in said near position to effect drying of said ink without effecting heat damage to said articles when said articles are moving at said predetermined rate of speed and to move said lamp toward said position farther away from said articles to effect drying of said ink without effecting heat damage to said articles when said

articles are moving at a speed less than said predetermined speed, said control means comprising a first switch responsive to opening movement of said door to move said lamp from said position near said articles toward said position farther away from said articles as said deflector is moved toward said one position wherein said deflector is disposed between said lamp and said path.

4,072,100

NUMBERING MACHINE ASSEMBLY ESPECIALLY ADAPTED FOR USE WITH PRINTING MACHINERY

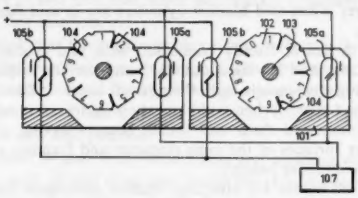
Francois Polo, 7, rue Jean Jaures, 93140 Bondy, France

Filed Aug. 2, 1976, Ser. No. 710,868

Claims priority, application France, Aug. 7, 1975, 75 24617; July 6, 1976, 76 20642

Int. Cl.² B41L *45/00*

U.S. Cl. 101—79 **16 Claims**



1. In a numbering assembly adapted to be inserted in a printing machine, said assembly comprising at least one numbering machine the operation of which is to be checked, said at least one numbering machine having a plurality of rotatably mounted printing discs, each disc having a plurality of printing faces, adapted to be brought successively into a printing position as said disc rotates, the improvement according to which said assembly also comprises

at least one monitoring numbering machine having printing discs connected to rotate in synchronism with those of said at least one numbering machine to be checked, each printing disc of said monitoring machine having the same number of printing faces as the discs of said numbering machine to be checked, and each disc of each machine being connected to produce a signal when a printing face is in printing position,

and indicating means responsive to said signals for producing an error signal when at least one of the discs of the machine to be checked occupies an angular position different from that of the corresponding disc of said monitoring machine.

4,072,101

LINEAR ACTUATOR PRINTER CARRIAGE

Joe La Garcia, Arvada, Colo.; Brandt Mead Griffing, Arcadia, Fla.; Paul Yu-Fei Hu, Boulder, and Richard George Millington, Longmont, both of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 27, 1976, Ser. No. 690,770

Int. Cl.² B41J *9/04*

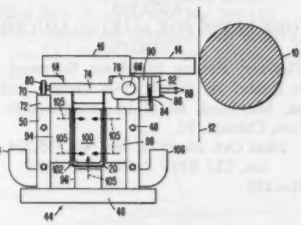
U.S. Cl. 101—93.15 **3 Claims**

1. Linear actuator comprising in combination:

a single rectangular magnetic flux return path; said magnetic flux return path being stationary and centrally located;

a magnetic structure being positioned in spaced relation with only three sides of said return path; said magnetic structure having only three pieces of rectangular slab magnetts being arranged so that each piece of the slab magnets faces one of the sides of said magnetic flux return path to supply flux lines perpendicular to said return path;

an air gap operably positioned between the magnetic flux return path and the slab magnets;



a coil bobbin means operably positioned to move within said air gap; and means operable for supplying electrical energy to said coil bobbin.

4,072,102

FLUID APPLYING PLATE

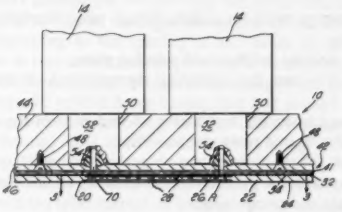
Harold Frederick Farrow, Hitchin, England, assignor to Colorflo Limited, Hitchin, England

Filed Oct. 28, 1976, Ser. No. 736,568

Claims priority, application United Kingdom, Nov. 20, 1975, 47832/75

Int. Cl.² B41F *3/36, 1/40*

U.S. Cl. 101—151 **9 Claims**



1. Apparatus for depositing fluid on a substrate in a predetermined design comprising:

a die plate having a recess in a first surface thereof corresponding with said design;

a first passage means in said die plate connecting a second surface of said die plate with said recess to deliver fluid into said recess, said second surface being the opposite and parallel surface from said first surface of said die plate;

a planar, rigid feed plate having a first surface thereof which is free of any projections therefrom and which is adherently bonded to said second surface of said die plate to form a two-part die assembly;

a second passage means in said feed plate connecting a second surface opposite and parallel to said first surface of said feed plate to deliver fluid therethrough to said first passage means in said die plate without contacting said second surface of said feed plate;

a plurality of fluid injector units adapted for directing fluid into said second passage means in said feed plate for transmission into said recess;

support means for supporting said plurality of fluid injector units having a first surface thereof which is detachably bonded to said two-part die assembly and which is provided with a third passage means through which fluid flows from certain of said injectors; and

at least one lateral fluid distribution channel formed in said two-part die assembly, each lateral fluid distribution channel being formed between said adherently bonded die and

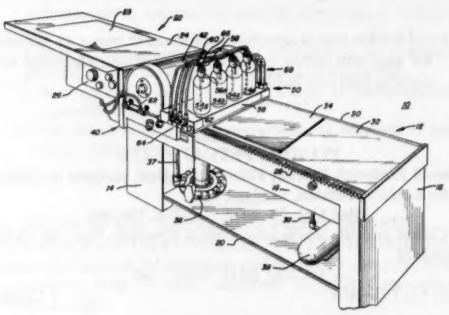
feed plates with said second surface of said feed plate blocking fluid flow back into other of said injectors.

4,072,103

GRAVURE PRESS FOR MAKING MULTICOLOR PROOFS

C. Hugh Fletcher, Rolling Meadows; Raymond G. Bogdan, Glenview; Robert W. Wright, Des Plaines, and Robert M. Cheuvront, Maywood, all of Ill., assignors to Vandersons Corporation, Chicago, Ill.

Filed Oct. 26, 1976, Ser. No. 735,264
Int. Cl.[2] B41F *3/36, 3/38, 3/28*
U.S. Cl. 101—151 **5 Claims**



1. A gravure press for making proofs using a printing plate comprising:

a press bed for holding said printing plate;

a control system for regulating the operation of said press; and,

a carriage assembly responsive to said control for moving relative to said plate and including:

an ink distribution system responsive to said control for dispensing a predetermined quantity of ink upon said plate and comprising:

a plurality of reservoirs for containing ink;

a plurality of retaining cylinders each having a longitudinal receiving channel recessed from the surface for temporarily holding ink;

a housing holding said retaining cylinders for rotational movement about the axis of said cylinder;

a plurality of transfer devices each connected to one of said reservoirs and one of said retaining cylinders and responsive to said control for filling said channel of one of said retaining cylinders with ink; and,

a plurality of actuators each connected to one of said cylinders for rotating said cylinder to dispense ink;

spreading means responsive to said control for uniformly moving said dispensed ink across said plate; and,

a cleaning unit responsive to said control for removing said dispensed ink after printing.

4,072,104

PRINTING UNIT DRIVE SYSTEM

Robert H. Schaffer, Mystic, Conn., assignor to Harris-Intertype Corporation, Cleveland, Ohio

Continuation of Ser. No. 384,403, Aug. 1, 1973, abandoned. This application Nov. 3, 1975, Ser. No. 628,056
Int. Cl.[2] B41F *13/12*
U.S. Cl. 101—248 **5 Claims**

1. A printing press comprising,

first and second blanket cylinders defining a printing nip and having a first position in which said blanket cylinders are cooperable to print on opposite sides of sheet material advanced through the nip and a second position in which said blanket cylinders are ineffective to print on the sheet material,

a first bearer fixedly connected with said first blanket cylinder and having a circular outer surface,

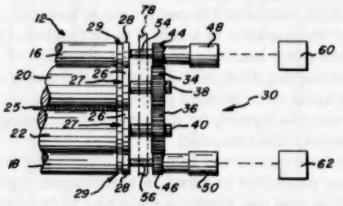
a second bearer fixedly connected with said second blanket cylinder and having a circular outer surface of the same diameter as the diameter of the circular outer surface of said first bearer, said outer surfaces of said first and second bearers being disposed in rolling engagement when said blanket cylinders are in said first position, said first and second bearers forming a set of blanket cylinder bearers,

first and second plate cylinders which engage said blanket cylinders when the blanket cylinders are in the first position, each of said plate cylinders being spaced apart from and ineffective to transfer an image to the associated blanket cylinder when the blanket cylinders are in the second position,

a third bearer fixedly connected with said first plate cylinder and having a circular outer surface disposed in rolling engagement with the circular outer surface of said first bearer when said blanket cylinders are in said first position,

a fourth bearer fixedly connected with said second plate cylinder and having a circular outer surface disposed in rolling engagement with the circular outer surface of said second bearer when said blanket cylinders are in said first position, said third and fourth bearers having circular outer surfaces of the same diameter and forming a set of plate cylinder bearers,

throw-off means for effecting relative movement between



said first and second blanket cylinders from the first position to the second position in which said blanket cylinders are ineffective to print on sheet material and are spaced apart from said plate cylinders, said throw-off means being effective to relatively move said blanket cylinders from the second position to the first position in which said blanket cylinders are effective to print on sheet material and are in engagement with said plate cylinders,

means for drivingly interconnecting said first and second blanket cylinders when in their first and second positions, said means for drivingly interconnecting said first and second blanket cylinders comprising,

first and second gears having equal numbers of teeth and having design pitch circles of the same diameters as said first and second bearers,

said first and second gears being different from standard gears in that said first and second gears each have a design pitch diameter which is greater than the number of teeth on the gear divided by the diametral pitch of the gear,

means for connecting said first gear to said first blanket cylinder in a coaxial relationship with said first bearer, and

means for connecting said second gear to said second blanket cylinder in a coaxial relationship with said second bearer,

said first and second gears having gear teeth which are disposed in meshing engagement when said blanket cylinders are in their first and second positions,

said design pitch circles of said first and second gears having a single point of intersection when said blanket cylinders are in said first position,

said first and second gears forming a set of blanket cylinder

gears which is associated with said set of blanket cylinder bearers,

a third gear having gear teeth disposed in meshing engagement with gear teeth of said first gear when said first and second blanket cylinders are in their first and second positions,

a fourth gear having gear teeth disposed in meshing engagement with gear teeth of said second gear when said first and second blanket cylinders are in their first and second positions,

means drivingly connecting said third gear with said first plate cylinder in a coaxial relationship with said third bearer,

said third gear having a design pitch circle of a diameter which is greater than the diameter of said third bearer, said design pitch circle of said third gear overlapping and having two points of intersection with the design pitch circle of said first gear when said blanket cylinders are in said first position,

said third gear having a working pitch circle which is of a smaller diameter than its design pitch circle, the working pitch circle of said third gear being tangent to the working pitch circle of said first gear when said blanket cylinders are in said first position,

the number of gear teeth on said first gear meshing with the gear teeth of said third gear being less than that required to rotate the surface of said first plate cylinder at the surface speed of said first blanket cylinder,

said means drivingly connecting said third gear with said first plate cylinder including means for effecting rotation of said first plate cylinder relative to said third gear to effect rotation of the surface of said first plate cylinder at the surface speed of said first blanket cylinder,

means drivingly connecting said fourth gear with said second plate cylinder in a coaxial relationship with said fourth bearer,

said fourth gear having a design pitch circle of a diameter which is greater than the diameter of said fourth bearer, said design pitch circle of said fourth gear overlapping and having two points of intersection with the design pitch circle of said second gear when said blanket cylinders are in said first position,

said fourth gear having a working pitch circle which is of a smaller diameter than its design pitch circle, the working pitch circle of said fourth gear being tangent to the working pitch circle of said second gear when said blanket cylinders are in said first position,

the number of gear teeth on said second gear meshing with gear teeth of said fourth gear being less than required to rotate the surface of said second plate cylinder at the surface speed of said second blanket cylinder,

said third and fourth gears each being different from standard gears in that said third and fourth gears each have a design pitch diameter which is greater than the number of teeth on the gear divided by the diametrical pitch of the gear,

said third and fourth gears forming a set of plate cylindrical gears which is associated with said set of plate cylinder bearers,

said means for drivingly connecting said fourth gear with said second plate cylinder including means for effecting rotation of said second plate cylinder relative to said fourth gear to effect rotation of the surface of said second plate cylinder at the surface speed of said second blanket cylinder.

4,072,105

LABEL PRINTING AND DISPENSING APPARATUS

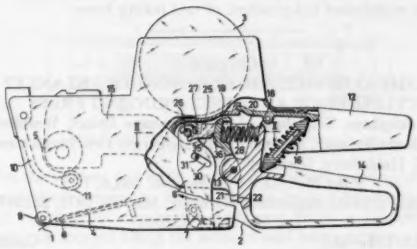
Werner Becker, Hauptstrasse 26, and Kurt Schrotz, Brentanostrasse 29, both of Hirschhorn, Germany (6932)

Filed July 14, 1976, Ser. No. 705,162

Claims priority, application Germany, July 8, 1975, 2530346

Int. Cl.[2] B41F *1/08;* B65C *11/00*

U.S. Cl. 101—288 **5 Claims**



1. Apparatus for printing and dispensing labels carried on a label ribbon for indexing step-by-step along a path of travel through the apparatus, the labels being printed with a prescribed minimum printing pressure, said apparatus comprising:

a hand lever movable between a rest position and a depressed position;

a return spring biasing the hand lever toward the rest position;

a transport mechanism for moving the label ribbon along said path of travel through increments of advancement corresponding to the spacing of the labels on the label ribbon in response to movement of the hand lever;

a second lever movable between a first position and a second position, the second lever having first and second ends;

a printing table located along said path of travel such that each indexed label is delivered to the printing table;

a printing device carried by the second lever at the first end thereof for movement toward and away from the printing table and the label thereat, in response to movement of the second lever, the printing device being away from the printing table when the second lever is in the first position and being at the printing table when the second lever is at the second position;

an inking device urged against the printing device with a given inking force when the second lever is at the first position, and movable away from the printing device in response to overcoming the given inking force;

coupling means coupling the hand lever with the second end of the second lever, said coupling means including

a drive spring between the hand lever and the second end of the second lever, the drive spring being capable of compression in response to movement of the hand lever from the rest position toward the depressed position, relative to the second lever;

a pawl movable between a locking position, wherein the pawl holds the second lever captive in the first position thereof against the force of compression of the drive spring and independent of the inking force during said movement of the hand lever relative to the second lever, and a disengaged position, wherein the second lever is released for immediate movement of the printing device toward the printing table in response to the force of the compressed drive spring;

biasing means urging the pawl into the locking position to maintain the second lever stationary in the first position thereof as the hand lever is moved from the rest position toward the depressed position and the drive spring is compressed; and

tripping means on the hand lever for intercepting the pawl during movement of the hand lever from the rest position

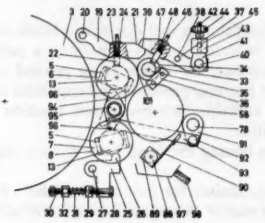
toward the depressed position, said tripping means moving the pawl from the locking position to the disengaged position when the drive spring has been compressed sufficiently to provide a predetermined force capable of overcoming the given inking force and driving the printing device toward the printing table with sufficient momentum to establish said prescribed minimum printing pressure upon arrival of said printing device at the printing table whereby said prescribed minimum printing pressure is established independent of said inking force.

4,072,106

WASHING DEVICE FOR CLEANING THE BLANKET CYLINDER OF AN OFFSET PRINTING PRESS

Rudi Junghans, Wilhelmsfeld, and Hermann Beisel, Walldorf, both of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Germany

Filed Nov. 13, 1975, Ser. No. 631,677
Claims priority, application Germany, May 10, 1975, 2520919
Int. Cl.[2] B41F *35/06*
U.S. Cl. 101—425 **7 Claims**



1. In a washing device for an offset printing press having a blanket cylinder, the washing device being adjustable with respect to the blanket cylinder and including a rotary washing roller having a soft covering and being in frictional driving engagement with the blanket cylinder, a doctor roller having a surface located in engagement with the washing roller, a distributor roller having a firm surface engaging the soft covering of the washing roller at a location upstream of the doctor roller in the rotary direction of the washing roller, means for feeding and controllably applying fresh washing solution to said distributor roller, a collecting vessel located below said doctor roller, and a doctor blade operatively connected with the doctor roller for guiding therefrom into the collecting vessel ink washed off the blanket cylinder with the wash solution, the improvement therein which comprises a second washing roller in frictional driving engagement with the blanket cylinder, means for effecting traversal of the blanket cylinder by both of said washing rollers, said washing rollers being additionally drivable by said doctor roller, both said washing rollers simultaneously being respectively connectible to and disconnectible from said blanket cylinder and said doctor roller.

4,072,107

MISSILE CONTROL MEANS

Frederick E. Saxe, Sparta, and Seymour K. Einbinder, Wayne, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 7, 1967, Ser. No. 645,101
Int. Cl.[2] F42B *25/16, 13/48*
U.S. Cl. 102—4 **6 Claims**

1. An anti-material missile comprising
a tubular housing member,
anti-material sub-missiles retained in said housing member and adapted to be dispersed by centrifugal force when said housing member is rotated,
a plurality of control fins for slowing and rotating said housing member, and
means for mounting said fins on said housing member and for moving said fins into operative positions, comprising
a plurality of tubular mounting means mounted on said housing member for rotation about a first axis normal to the longitudinal axis of said member,
a plurality of arm means each attached to one of said fins and mounted on one of said tubular means for pivotal movement about a second axis normal to said first axis,

means for pivoting said arm means to orient said fins in radial planes parallel to said longitudinal axis, and
means for independently rotating said tubular means to re-orient said fins in radial planes canted with respect to said longitudinal axis, to cause rotation of said missile during flight

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4,072,108

FUZE ENCODER DEVICE

William Lewis, Andover, Mass.; Peter J. Weldon, Blairstown; Henry Hagedorn, Jr., North Haledon, both of N.J.; Thomas E. Hayes, Newton, N.J., and Sylvan H. Israels, Morris Plains, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

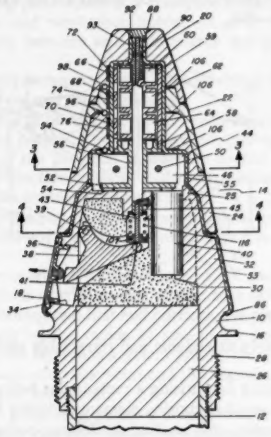
Filed Oct. 7, 1976, Ser. No. 730,402
Int. Cl.[2] F42C *11/06, 17/00*
U.S. Cl. 102—70.2 R **7 Claims**

1. A fuze encoder device for a spin stabilized shell which comprises:
shell housing means for supporting said encoder device which includes;
a cup shaped intrusion section, having a forward end and a rear end, threadedly supported on said shell housing means;
a stepped shaped cup stakedly disposed on and sealed to the forward end of said intrusion section, said stepped cup having a shoulder section having a plurality of circularly disposed hemispherically shaped lower detent ball seats therein;
a setback generator positioned in said aft end of said shell housing means for providing electrical energy for said encoder device;
electronic counting means, disposed in said forward end of said intrusion section, for generating an output fuzing signal;
a magnetic encoding sensor, positioned in said forward end of said intrusion section, being electrically coupled to said electronic counting means for generating pulses for setting said electronic counting means;
encoding disc means, rotatably disposed in said forward end of said stepped shaped cup and adjacent to said magnetic

encoding sensor, for inducing voltage pulses in said magnetic encoding sensor;

setback detented despin weight means biasedly coupled to said encoding disc for providing relative rotation of said encoding disc means with respect to said magnetic encoding sensor when the setback forces of launch of said spin stabilized shell decrease;

indexing ring means, rotatably detented and slidably disposed on said shell housing means, for forming an ogive contour for said spin stabilized shell and for indicating a time for firing said shell, and for rotatably positioning a plurality of localized magnetic fields therein;



stop coil-pole means fixedly attached to rotate in unison with said encoding disc means and rotatably axially supported within said indexing ring means in the forward end of said intrusion section, for generating a plurality of stop pulse signals, in response to the passage of said coil-pole means in the proximity of said localized magnetic fields said plurality of stop pulse signals controlling said electronic counting means to initiate said output fuzing signal as a function of time set by said indexing ring means; and

lock button detent release means, operatively disposed in said shell housing means, for releasing said indexing ring means to permit rotation therebetween to change the time set for firing said shell after launch and for preventing inadvertent movement of said indexing ring means.

4,072,109

PNEUMATICALLY CONVEYED CONTAINER WITH AIR TIGHT SEALING AND GUIDE MEANS

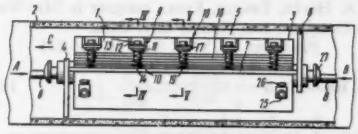
Pavel Vasilievich Kovanov, B. Bronnaya ulitsa, 19/21, kv. 23; Ivan Mikhailovich Torochkov, ulitsa Gorkogo, 41, kv. 99; Ivan Timofeevich Zonenko, Saperny proezd, 8, korpus 3, kv. 72; Adolf Moritsovich Alexandrov, Federativny prospekt, 6, korpus 3, kv. 8; Vladimir Efimovich Aglitsky, Zatsepsky val, 6/13, kv. 61; Jury Abramovich Tsimbler, Sojuzny prospekt, 10, kv. 261; Ilya Solomonovich Kantor, Malo-Moskovskaya ulitsa, 31, kv. 45; Jury Arnoldovich Topolyansky, Matveevskaya ulitsa, 10, korpus 4, kv. 233, and Mikhail Vladimirovich Lurie, Veernaya ulitsa, 40, korpus 3, kv. 43, all of Moscow, U.S.S.R.

Filed Mar. 19, 1976, Ser. No. 668,444

Int. Cl.[2] B61B *13/10*

U.S. Cl. 104—138 R **4 Claims**

1. A container for pneumatic transportation of loads through a pipeline wherein the internal surface of the pipeline has guides located opposite each other throughout the pipeline length, said container comprising: a body; a front cup means mounted on the front end face of said body in the direction of movement of said body for sealing off the lower half only of the gap between said body and the pipeline; a rear cup means mounted on the rear end face or said body for sealing off the upper half only of the gap between said body and pipeline; longitudinal cup means located on the sides of said body and extending between said front and rear cup means, said longitudinal cup means resting on said guides located in said pipeline and serving as sliding supports for the container during movement; said longitudinal cup means installed at a certain distance



from the sides of said body; means for resilient pressing of said longitudinal cup means against said guides and for connecting said longitudinal cup means with said body; a plurality of partitions located along the sides of said body, each partition secured to said body at one side and secured to the corresponding longitudinal cup means at the other side; said partitions permitting vertical motion of said body relative to said longitudinal cup means and for sealing the gap between said body and said longitudinal cup means.

4,072,110

ELECTROMAGNETIC SUSPENSION ASSEMBLY

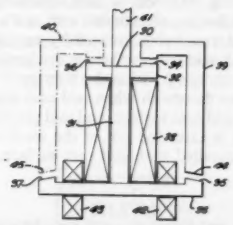
Bhalchandra Vinayak Jayawant, Kingston, near Lewes, England, assignor to The University of Sussex, Sussex, England

Filed Sept. 3, 1976, Ser. No. 720,447

Claims priority, application United Kingdom, Sept. 5, 1975, 36652/75

Int. Cl.[2] B61B *13/08*

U.S. Cl. 104—148 MS **8 Claims**



1. An electromagnetic suspension system for a vehicle to be levitated by magnetic attraction comprising an electromagnetic core on the vehicle having an upright core portion with upper arms extending outwardly from the top of said upright core portion and lower arms extending outwardly from the bottom of said upright core portion, the lower arms being longer than the upper arms, the upper arms having, at their outer ends, horizontal upwardly facing pole faces, and the lower arms, at their outer ends, each having a pole face sloping at an angle to the horizontal; and, for supporting the vehicle, a ferro-magnetic reaction rail on at least one side of said core and having a horizontal top portion extending inwardly from the upper end of a vertical side portion, thereby forming an inverted L-shaped structure when considered in transverse section, said horizontal top portion extending inwardly towards said core from the upper end of said vertical side portion, said horizontal top portion having, at its inner end, a downwardly facing horizontal pole face which, with one of said upwardly facing pole faces, defines a first air gap, said vertical side portion having, at its lower end, a pole face sloping at an angle to the horizontal which pole face, with the aforesaid pole face on one of said lower arms, defines a second air gap; a main lift

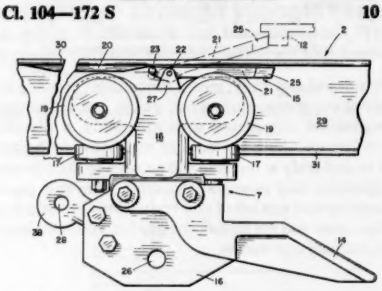
winding on said upright portion of the core, means for energising said main lift winding to provide magnetic flux across said first air gap for giving a vertical support force on said core, lateral guidance windings on each of said lower arms of the core and means for selectively energizing said lateral guidance windings.

4,072,111

CONVEYOR CARRIER WITH ACTUATED DOG

Robert A. Hoehn, Lenexa, Kans., assignor to Mid-West Conveyor Company, Inc., Kansas City, Kans.

Filed Oct. 26, 1976, Ser. No. 735,831
Int. Cl.² B61B *10/02*
U.S. Cl. 104—172 S **10 Claims**



1. In a power and free conveyor system having a load supporting track with a hollow interior, a leading trolley, and an interconnected following trolley that are conveyed on said track by engagement of a driving dog on said leading trolley with a power dog on a first conveyor chain, the improved means for transferring the conveying of said trolleys by said first chain to a second conveyor chain, comprising:

a. a cam having an actuating surface substantially entirely located within the hollow interior of said track; and

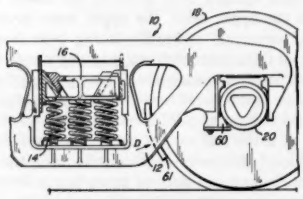
b. a transfer dog attached to said following trolley, said transfer dog having a pivotable arm and a cam follower thereon, said arm being pivoted by engagement of said follower with said cam surface, and wherein said transfer dog is fully retracted within the interior of said track and out of contact therewith when said cam follower is disengaged from said cam surface, and said pivotable arm of the transfer dog is extended out of the track when the cam follower is engaged with said cam surface.

4,072,112

RESILIENTLY BIASING TRUCK PEDESTAL BEARING RETENTION ASSEMBLY

Donald Wiebe, Sewickley, Pa., assignor to A. Stucki Company, Pittsburgh, Pa.

Filed May 24, 1976, Ser. No. 688,942
Int. Cl.² B61F *5/34, 5/52, 15/06, 15/20*
U.S. Cl. 105—221 K **13 Claims**



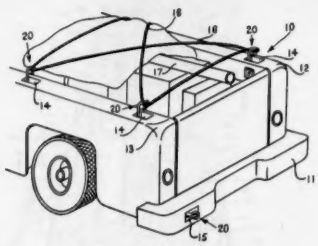
1. A side frame bracket assembly for positively retaining an axle bearing carrier assembly within the pedestal opening of a narrow pedestal type side frame of a railway truck assembly comprising: a retaining bracket adapted to be carried by a pedestal jaw of such a pedestal opening adjacent a lower end portion thereof; biasing means adapted to be carried by said bracket and disposed intermediate such a pedestal jaw and such a bearing carrier assembly and operative to bias such a bearing carrier assembly out of communication with such a pedestal jaw and into communication with the other pedestal jaw of such a pedestal opening continuously during all normal moving operation of such a railway truck assembly.

4,072,113

SHIFTABLE ANCHOR ASSEMBLY

Harold H. Thurston, P.O. Box 57, Yerington, Nev. 89447

Filed July 28, 1976, Ser. No. 704,732
Int. Cl.² B60P *7/04, 7/08*; B61D *45/00*; F16B *45/00*
U.S. Cl. 105—484 **12 Claims**



1. A slideably extendable and retractable anchoring device comprising:

1. An housing comprising a rectangular hollow member;

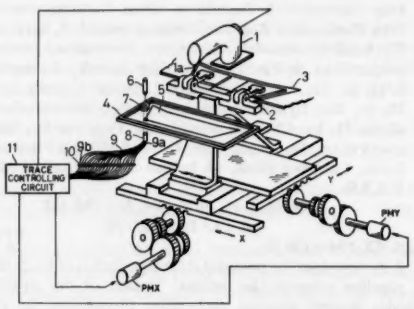
2. An elongated anchoring element slideably located within said housing, said anchoring element comprising a hook extending outside of said housing, with an extension on said hook having a closed ended slot located within said extension slideably mounted within said housing; and (3) Means to affix the said housing to a desired location, said means comprising a fastening member passing through said housing and said slot in such manner that the fastening member limits the extent of movement of the anchoring element.

4,072,114

CONTOUR TRACING SEWING MACHINE

Akira Sugiyama, Nagoya; Yoshikazu Yamamoto, Toyoake, and Shiro Yamada, Kasugai, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed June 21, 1976, Ser. No. 697,877
Claims priority, application Japan, July 1, 1975, 50-81662
Int. Cl.² D05B *21/00*
U.S. Cl. 112—121.12 **7 Claims**



7. A contour tracing sewing machine for controlling the

movement of a workpiece holder, which is connected to each of X, Y pulse motors for transferring a workpiece along X, Y axis perpendicular to each other, by tracing the contour of a prearranged templet in order to form a seam conformable to said contour on said workpiece by sewing instrumentalities, said sewing machine comprising:

a. a light source;

b. a plurality of light transmitting fibers each having a first end portion and a second end portion, said first end portions being opposite to said light source and successively arranged in a circle the radius of which is equal to the distance (P) between stitches to be produced on said workpiece;

c. a mounting plate made of a transparent material and attached to said workpiece holder so as to be movable transversely between said light source and said first end portions;

d. said templet being made of a light-shielding material and positioned on said mounting plate;

e. a plurality of photoelectric sensors each connected to said second end portion for generating electric signals representative of the presence or absence of said templet according to the transmission or the untransmission of light rays emitted by said light source;

f. one of multiple mid points between respective neighboring two first end portions being predetermined as a reference point;

g. means for storing multiple sets of X, Y pulse numbers which each is corresponding to the mid point between said neighboring two first end portions and predetermined on the basis of the radius of said circle and the angle formed by the reference segment joining the center of said circle to said reference point and the segment joining the center to said mid point;

h. means for generating pulses at a high frequency in relationship with the position of the needle of said sewing instrumentalities;

i. state searching means responsive to said electric signals for sequentially searching the state of said mid point from the state of said reference point in a predetermined circumferential direction of said circle synchronously with each of the pulses generated by said generating means, and for thereby detecting the first transitional state of said mid point from said presence to said absence or the second transitional state of said mid point from absence to said presence;

j. a counter for counting the number of the pulses generated by said generating means and extracting said set of X, Y pulse numbers from said storing means;

k. a logic circuit for interrupting said generating means from generating said pulses when said state searching means has detected said first transitional state or said second transitional state;

l. means for changing the transitional state to be detected by said state searching means either from said first transitional state to said second transitional state or from said second transitional state to said first transitional state; and,

m. driving means for generating X, Y pulse signals, the X, Y pulse numbers of which are respectively equal to the X, Y pulse numbers extracted according to the output signal of said counter at the stoppage of the generation of said pulses, and for driving said X, Y pulse motors.

4,072,115

SEWING MACHINE FOR FORMING SHAPED FABRIC BELTS

Nerino Marforio, Milan, Italy, assignor to Rockwell-Rimoldi S.p.A., Milan, Italy

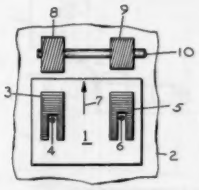
Filed Sept. 29, 1976, Ser. No. 727,887
Claims priority, application Italy, Oct. 3, 1975, 27913/75
Int. Cl.[2] D05B *27/00*
U.S. Cl. 112—205 **2 Claims**

1. An apparatus for forming shaped fabric belts in a sewing machine having a work bed plate with a throat plate mounted thereon in operative association with a pair of needles cooperating with the machines lower stitching instrumentalities to form upper and lower parallel lines of stitching in a belt, said apparatus comprising:

(a) a first feeding mechanism including:

(i) a first feed dog (3) mounted in operative association with the throat plate for stroke movements of a preselected length;

(ii) a first roller (8) carried by the machine adjacent said



first feed dog (3) and rotatably indexed to define an advancement stroke equivalent to that of the latter;

(b) a second feeding mechanism including:

(i) a second feed dog (5) mounted in operative association with the throat plate for stroke movements of a length different from said first feed dog (3); and

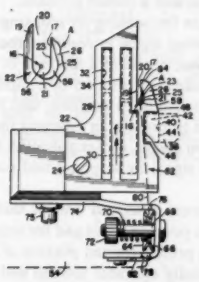
(ii) a second roller (9) operatively connected to said first roller (8) adjacent said second feed dog (5) and rotatably indexed to define an advancement stroke equivalent to that of the latter.

4,072,116

OVEREDGE STITCH SEWING MACHINE

Joseph Nagy, St. Andre-les-Vergers, France, assignor to Union Special Corporation, Chicago, Ill.

Continuation of Ser. No. 589,302, June 23, 1975, abandoned.
This application Feb. 28, 1977, Ser. No. 772,702
Claims priority, application France, Feb. 24, 1975, 75 05653
Int. Cl.[2] D05B *65/00, 53/00*
U.S. Cl. 112—286 **5 Claims**



5. A sewing machine capable of producing a thread chain having a thread chain positioning means for guiding the thread chain in a predetermined manner comprising:

a throat plate means;

a throat slot means in said throat plate means, said throat slot means being located along the needle center line of said sewing machine and having a front section means and right and left side section means;

the front section means of said throat slot means having a forwardly sloping groove means capable of carrying a thread chain; and

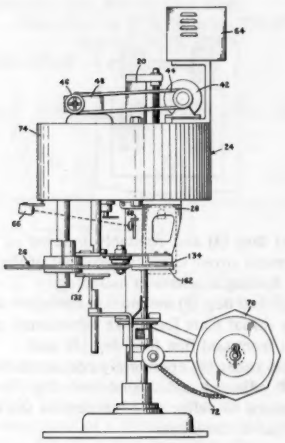
a thread retainer means positioned in front of said throat slot means generally in line with said groove means.

4,072,117

CANISTER INDEXING SPOUT-INSERTING MACHINE

Frederick August Plaessmann, Edison, N.J., assignor to Seal-Spout Corporation, Liberty Corner, N.J.

Filed Sept. 15, 1976, Ser. No. 723,476
Int. Cl.[2] B21D *39/00*
U.S. Cl. 113—1 H 20 Claims



1. A machine for mounting a pouring spout at a predetermined position on the wall of a canister comprising:

carriage means for intermittently moving in one direction a canister on a continuous path having a plurality of work stations;

first holding means for releasably holding said canister on said carriage, said holding means operable between an open position and a closed position;

detection means for sensing an indexing mark and for providing a control signal in response thereto, said detection means disposed adjacent a first one of said work stations;

registration means for rotation of a canister with first holding means at said open position, said rotation at said first work station to present an indexing mark on a canister to said detection means, said registration means responsive to said control signal by stopping said rotation of said canisters;

a carrier adjacent a second one of said work stations for supporting a pouring spout and for sequentially presenting a spout to a predetermined portion of a canister wall; and

a ram reciprocally operable toward and away from a canister wall to push a spout portion through said canister wall and withdraw from the spout respectively; and

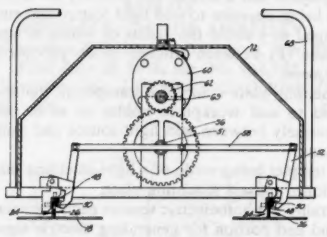
said sequencing means coacting with said first holding means to open said first holding means to receive said canister, to close said first holding means for transporting said canister to said first work station, to open said canister at said first work station for rotation of said canister, to close said first holding means after rotation of said canister for movement of said canister through the remainder of said plurality of work stations while holding said canister in a fixed angular orientation with relation to said plurality of work stations, and opening said first holding means to release said canister at the end of said continuous path having a plurality of work stations.

4,072,118

SEAM CRIMPING APPARATUS

Adrian Schultheiss, Hamilton, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio

Filed Dec. 15, 1976, Ser. No. 750,599
Int. Cl.[2] B21D *19/00*
U.S. Cl. 113—57 5 Claims



1. A seam crimping apparatus for crimping standing seams of roofing panels of the type having a surface portion and an upstanding rib along each longitudinal edge thereof, each rib being configured to mate with the corresponding rib of an adjacent panel and having a substantially vertical upstanding member, a substantially horizontal upper flange portion and a deformable flange hook portion extending downwardly from the upper portion toward the surface portion, to form a standing seam, which comprises:

a. a frame sized to span two parallel standing seams, said frame carrying a first pair of spaced, coplanar, horizontal abutment surfaces for each standing seam adapted to overlie said horizontal flange portion of said standing seams and a second pair of spaced, coplanar, substantially vertical abutment surfaces for each seam adapted to abut the vertical upstanding member of said seams, and wheels retractably mounted in at least said horizontal abutment surfaces to guide and support said seam crimping apparatus along the standing seams;

b. at least one crimping blade for each standing seam pivotally mounted and connected to levers carried on said frame for swinging movement between an open position and a closed position, each said crimping blade being substantially parallel to its respective seam when said apparatus is in work crimping position and lying on the opposite side of its respective seam from its respective pair of vertical abutment surfaces and parallel to the flange portion of its respective seam, each said crimping blade being backed by said abutment surfaces and being of a length sufficient to span its respective pairs of vertical and horizontal abutment surfaces, each said blade being shiftable between an open position wherein it is parallel and out of contact with its respective deformable flange hook portion of said seam, and a closed position wherein it is in contact with its respective deformable flange hood portion and has crimped said hook portion as desired; and

c. means to shift said crimping blades between their open and closed positions simultaneously.

4,072,119

VERTICAL RISING BOAT LIFT

Barney V. Williams, 418 "C" SW. St., Miami, Okla. 74354

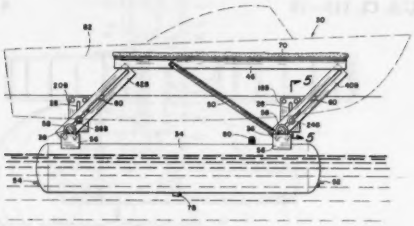
Filed Mar. 21, 1977, Ser. No. 781,769
Int. Cl.[2] B63C *1/02*
U.S. Cl. 114—45 7 Claims

1. For mounting in a boat well having opposed parallel vertical sides spaced above the surface of a body of water, the spacing between the sides of the boat well being dimensioned to receive a boat therein floating on the water, an apparatus to lift a boat within the boat well above the water surface, comprising:

a forward pair of trunnion members supported to said boat

well side wells in horizontal axial alignment and a rearward pair of trunnion members supported to said boat well sidewalls in horizontal axial alignment, the axii of the forward and rearward pairs of trunnion members being parallel and spaced apart from each other;

a frame adapted to be lowered to receive a boat floating in the water thereon and to be raised with a boat thereon to lift the boat thereon above the water surface, the frame having a forward pair of guide members and a rearward pair of guide members, the four guide members each being in vertical planes and each having an elongated slot therein which slidably receives a said trunnion member,



the slots in each of said four guide members being of the same angle relative to vertical of between 15° and 75°, the frame having means thereon to engage the bottom of a boat when the frame is lowered to a lowermost position with a portion thereon below the water surface;

a pontoon secured to the lower portion of said frame;

means for admitting water into the pontoon to sink the pontoon and a portion of said frame below the water surface; and

means to evacuate water from said pontoon to float the frame upwardly to support a boat thereon above the water.

4,072,120

MARINE TRANSPORT

John J. Bylo, 7272 Willoughby Ave., Los Angeles, Calif. 90046

Division of Ser. No. 439,375, Feb. 4, 1974, Pat. No. 3,934,532, which is a continuation-in-part of Ser. No. 187,537, Oct. 7, 1971, Pat. No. 3,793,974, which is a continuation-in-part of Ser. No. 794,938, Jan. 29, 1969, abandoned. This application Jan. 16, 1976, Ser. No. 649,645

Int. Cl.[2] B63B *27/00*

U.S. Cl. 114—72 **13 Claims**

1. A method of transporting cargo by water comprising the steps of

(a) providing a plurality of modular cargo hold units of generally uniform external configuration and dimension over at least the lower portions thereof,

(b) establishing an overall route over which cargo is to be moved so that the route includes at least three ports, and subdividing the route into subroutes which connect each adjacent pair of ports in the overall route so that at least one port is the terminus for two adjacent subroutes,

(c) providing for each subroute a self-propelled shuttle vessel configured to mate with and to support at least any one of the hold units, each shuttle vessel being sized relative to a hold unit such that a loaded hold unit constitutes a substantial fraction of the load-carrying capacity of the vessel and each vessel being configured and arranged for operation along its subroute,

(d) providing in each port a dock facility arranged for receiving and supporting a hold unit independently of any of the vessels,

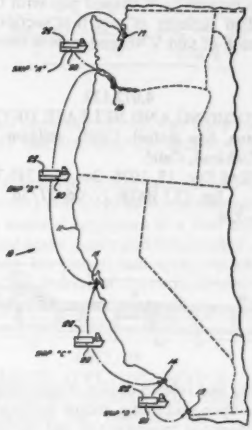
(e) loading into a hold unit at an originating port only cargo destined for a given different non-adjacent destination port in the overall route,

(f) moving a loaded hold unit between the originating port and the destination port on the route via one or more intermediate ports by

(i) moving the hold unit by a first shuttle vessel along a first subroute from the originating port to a first intermediate port,

(ii) transferring the hold unit from the first shuttle vessel to the dock facility in the first intermediate port,

(iii) transferring the hold unit from the dock facility in the first intermediate port to a second shuttle vessel for the subroute which is adjacent the first subroute, and



(iv) moving the hold unit toward the destination port by operating the second vessel along its subroute and by repeating steps (ii) and (iii) above in each intermediate port between the first intermediate port and the destination port so that the hold unit is moved along each subroute between the originating and destination ports by the shuttle vessel for each subroute, and

(g) removing from a hold unit cargo contained therein only on arrival of the hold unit at the destination port for which all cargo in the hold unit is destined.

4,072,121

YACHT MAST

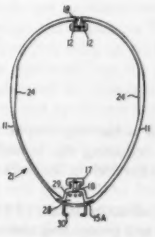
Warren Malcolm Anderson, Beacon Hill, and Clifford John Shaffran, Paddington, both of Australia, assignors to Clifford Industries PTY., Ltd., Sydney, Australia

Filed Sept. 20, 1976, Ser. No. 725,024

Claims priority, application Australia, Sept. 25, 1975, 3334/75

Int. Cl.[2] B63B *27/14;* **G63B** *35/00*

U.S. Cl. 114—90 **10 Claims**



1. An elongate mast section adapted for joining to a second similar mast section to form a yacht mast without use of rivets or weldments, each said mast section comprising:

an elongate shell having a curved cross-section and opposite ends, each said end having along each longitudinal side an

integral inwardly turned web, which joins a flange to said shell;

each said flange being inwardly turned towards said shell with respect to said web such that the transverse cross-section of the flange, web and the adjacent portion of the side form a substantially U-shaped portion; and,

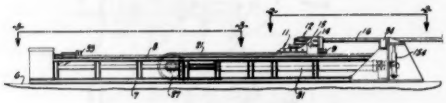
the outer surface of the base of said U-shaped portion being bevelled such that when said second similar mast section with a complementary bevel is brought into opposing side-by-side relationship with said first section, each of the corresponding bevelled surfaces of said second section forms a substantially V-shaped gap with the corresponding bevelled surfaces of said first section such that the apex of each of said V-shaped gaps is innermost.

4,072,122

MOORING AND RELEASE DEVICE

John C. Balston, San Rafael, Calif., assignor to The Rucker Company, Oakland, Calif.

Filed Dec. 13, 1976, Ser. No. 749,720
Int. Cl.² B63B *21/06, 21/56*
U.S. Cl. 114—230 **7 Claims**



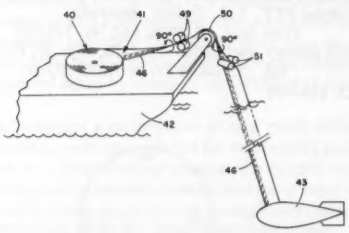
1. A mooring and release device comprising a frame, a carriage movable upon said frame, means involving fluid flow for affording resistance to movement of said carriage into a predetermined position on said frame, means for controlling said fluid flow to reduce said resistance, means on said carriage for mooring a line, means for actuating said mooring means to release said line, means responsive to the presence of said carriage in said predetermined position for operating said actuating means, and means for locking said carriage to said frame in said predetermined position.

4,072,123

DEEP TOWING CABLE AND HANDLING SYSTEM

Jimmy F. Byers, Rte. 1, Box 56, Georgetown, Tex. 78626

Filed Mar. 16, 1976, Ser. No. 667,315
Int. Cl.² B63B *21/00*
U.S. Cl. 114—254 **15 Claims**



10. A method of achieving deeper towing depths of towed submersibles and reducing the upsetting moment caused by towing equipment carried on the decks of surface vessels comprising:

deploying internal components of a flat tow cable in a linear arrangement and presenting the narrow dimension of the cable to the environment;

storing the cable in a horizontally disposed flat drum on the deck of the vessel so as to reduce the upsetting moment of the assembly;

deploying the cable from the horizontally disposed drum by rotating the cable 90° so as to pass over the stern in a horizontal attitude and reverse rotating the cable 90° so as to enter the medium in a fore and aft towing attitude; and

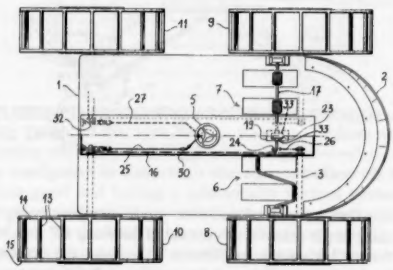
isolating electrical conductors in said cable from strain by strengthening the leading portion of the cable and placing the electrical conductors in the trailing portion of the cable.

4,072,124

NAUTICAL VEHICLE

Paul Meyrin, Lausanne, Switzerland, assignor to Gemeines Forchungsinstitut Anstalt, Liechtenstein, Liechtenstein

Filed Oct. 14, 1975, Ser. No. 621,790
Int. Cl.² B63H *1/38, 16/12*
U.S. Cl. 115—19 **4 Claims**



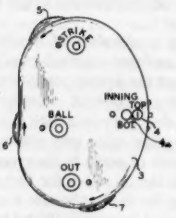
1. A nautical vehicle adapted to be operated by at least one user, comprising two identical sets of at least one inflatable wheel on each side of said vehicle, driving means comprising a pedal-like system and means for transmitting the motion of the pedal system to all of said wheels, and steering means comprising essentially means for selective braking of one set of said wheels and wherein said driving means comprises a differential gear comprising an input shaft coupled to said pedal-like system and two output shafts respectively coupled to said two sets of wheels.

4,072,125

UMPIRE'S COUNTER

Thomas W. Spalla, 607 Arbor Lane, Pittsburgh, Pa. 15236

Filed June 17, 1976, Ser. No. 697,052
Int. Cl.² A63B *71/06*
U.S. Cl. 116—120 **2 Claims**

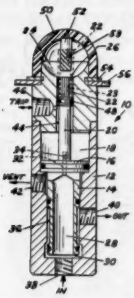


1. In an umpire's counter comprising a top cover plate and a bottom cover plate in closely spaced parallel relationship and "strike," "ball" and "out" indicating dials rotatably mounted therebetween with indicia visible from the outside of the top plate; the improvement comprising an "inning" indicating dial rotatably mounted between said cover plates and visible through opening means in said top plate and geared to said "out" indicating dial such that for each three outs, said "inning" indicating dial will be turned and advanced to denote another half inning.

4,072,126
VISUAL INDICATOR FOR SAFETY SYSTEMS

Willard E. Kemp, Houston, Tex., assignor to ACF Industries, Incorporated, New York, N.Y.

Filed July 15, 1976, Ser. No. 705,746
Int. Cl.² F16K *37/00*
U.S. Cl. 116—125 **11 Claims**



1. A visual indicator, comprising:

(a) a housing having an exterior reflecting surface defining a reflecting zone, and an aperture through said housing located at said reflecting surface,

(b) valve means mounted within said housing to control fluid flow between inlet, outlet, and exhaust valve ports and having a movable indicator member operably connected thereto, said indicator member positioned within the aperture and mounted for longitudinal movement between extended and retracted positions relative to the reflecting zone, and

(c) a transparent generally cup-shaped enclosure mounted in an inverted relation over said reflecting surface in spaced relation thereto, said enclosure having an elongated fixed indicator member secured centrally to the inner surface thereof and extending inwardly therefrom in longitudinal axial alignment with the movable indicator member,

(d) one of said indicator members being hollow and receiving the other indicator member in an overlapped relation when the movable indicator means is in an extended position outwardly of the reflecting surface, the movable indicator member being retracted from the overlapping position outwardly of the reflecting surface when the movable indicator means is in a retracted position, said movable indicator member and said fixed indicator member being of external contrasting colors at least for the lapped portions thereof,

(e) said valve means maintaining under normal operating conditions the movable indicator means in its retracted position with said fixed indicator member only being in the reflecting zone, said valve means upon receipt of a signal from an associated system permitting movement of the movable indicator means to the extended position with said movable indicator member being in the reflecting zone and in said overlapped relation with said fixed indicator member.

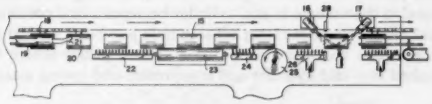
4,072,127
INSIDE STRIPE BY INTERMITTENT EXTERIOR SPRAY GUNS

Larry V. Cernauskas, Chicago, and Harry B. Foss, Oak Lawn, both of Ill., assignors to The Continental Group, Inc., New York, N.Y.

Division of Ser. No. 461,838, April 18, 1974, Pat. No. 3,995,075. This application Sept. 17, 1976, Ser. No. 724,234
Int. Cl.² B05C *7/02*
U.S. Cl. 118—2 **8 Claims**

1. An apparatus for spraying the inside of the can bodies having side seams and which can bodies pass end to end down a can body line from a can body side seamer with each can body spaced a distance from each other can body, said apparatus comprising in combination with said can body line;

a detector positioned alongside said can body line for sensing the presence of a can body as it passes, spray means fixedly positioned alongside said can body line out of the path of can bodies passing therealong and directed towards said can body line downstream thereof for successively spraying side stripe material through the space between can



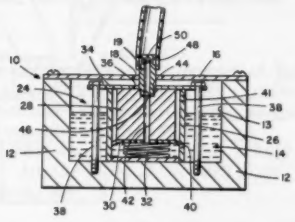
bodies into an open end of each can body moving along said can body line and unto the interior of moving can bodies, and

control means connected to said detector and to said spray means for causing said spray means to intermittently spray side striping material beginning at a time each can body has passed said spray means and for a period of time after each can body has passed said spray means but during such time as the interior of the respective can body is in the path of spray from said spray means.

4,072,128
LIQUID APPLYING DEVICE

Warren Phillip Frederick, McHenry, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jan. 28, 1976, Ser. No. 652,914
Int. Cl.² B05C *7/00*
U.S. Cl. 118—3 **5 Claims**



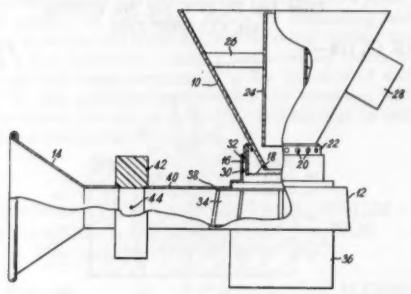
1. Device for applying liquid solvent to the interior surface of the end portion of a piece of plastic tubing of constant interior diameter, said device comprising a reservoir, at least one applicator post sized to receive the tubing end portion in a close sleeve fit and supported above said reservoir, and means which are associated with said reservoir, which mount said applicator post and which are manually operable, when the tubing end portion is first placed in a sleeve fit on said post, the tubing and post are moved inwardly of said device and then the tubing end portion is removed from the post, for applying liquid to the interior surface of the constant interior diameter of the tubing end portion, said applicator post having a generally axially extending bore extending into said post from one end thereof, but not through said post, having an annular groove on the periphery thereof adjacent the other end of said post and having at least one passageway between said generally axially extending bore and said annular groove, and said liquid applying means including pump means which, when pressed inwardly of said device, supplies a metered amount of liquid to said applicator post, said pump means comprising a cylinder having one end which is closed off and which is positioned in the liquid solvent in said reservoir, said cylinder having a hole therein spaced a predetermined distance from said closed end, but below the level of liquid solvent in said

reservoir, a piston in said cylinder having an axially extending passageway therethrough and means for mounting said applicator post on the outer end thereof with the axially extending passageway in said post being in communication with said passageway in said piston, spring means in said cylinder between said inner end of said piston and said closed end of said cylinder for biasing said piston outwardly of said cylinder, and stop means fixed in a position adjacent to and in engagement with the outer end of said piston to limit outward movement of said piston, the metered amount of liquid being substantially equal to the volume in said cylinder between a first position of said piston where it closes off said hole and bears against said stop means and a second position of said piston where it is pushed into said cylinder and compresses said spring means.

4,072,129
ELECTROSTATIC POWDER DEPOSITION

Alfred William Bright, Southampton, England; Michael Anthony Mersham Overton, Stavanger, Norway, and Ian Frederick Parker, Fareham, England, assignors to National Research Development Corporation, London, England

Filed Apr. 27, 1976, Ser. No. 680,878
Int. Cl.[2] B05B 5/02
U.S. Cl. 118—629 **10 Claims**



1. Apparatus for electrostatically depositing powder on an object comprising:

a housing;

means for producing a stream of air through said housing;

means for admitting powder to said housing at a predetermined rate and means for admitting air at a selectable rate for admixture with said powder to produce a predetermined density of suspension of said powder in said stream of air;

charging means contained within said housing including a rotor having a number of blades, each blade being adapted to intercept said stream of air on rotation of the rotor the blades and the housing having surface so disposed and constructed of such material as to cause triboelectric charging of the powder suspended in said stream of air on impact of said powder with said surfaces, said charging being sufficient to enable electrostatic deposition to be carried out under the influence of the electric field arising from such charge;

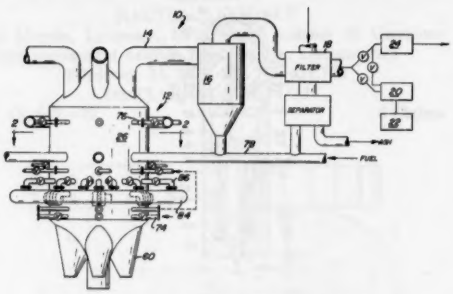
conduit means for conveying said stream of air from said charging means to a powder output position; and

output nozzle means situated at said output position for directing said stream of air in which said powder is suspended towards an object to be sprayed.

4,072,130
APPARATUS AND METHOD FOR GENERATING STEAM

Frederick A. Zenz, Garrison, N.Y., assignor to The Ducon Company, Inc., Mineola, N.Y.

Filed Dec. 1, 1976, Ser. No. 746,364
Int. Cl.[2] F22B 1/02
U.S. Cl. 122—4 D **11 Claims**



1. A method of generating steam comprising:

a. providing a combustor housing with a plurality of discrete chambers side by side and separated by upright walls,

b. flowing water upwardly through a separate vertically disposed tube bundle in each chamber, collecting the steam output from the upper end portion of said tube bundles for distribution,

c. fluidizing a fuel bed in each of said chambers to a height so that at least the lower end of the tube bundle in each chamber is disposed in its respective bed,

d. introducing fluidizing air to the bed of each chamber through a discrete independently operable downshot grid, the number of grids corresponding to the number of chambers and with each grid being adjacent the lower end of its respective chamber,

e. using a good heat conductive material for said walls, maintaining the temperature of any slumped bed in excess of the flashpoint of the fuel,

f. using at least one draw-off hopper below the elevation of the grids with the hopper being tapered to the angle of friction of the ash solids so that ash solids therein descend as a mass,

g. igniting the fluidized beds,

h. modulating at least one of the following as the amount of said collected steam and/or the demand for steam changes to thereby change the rate of production of steam in said tube bundles:

i. controlling fluidization of said beds whereby one or more non-adjacent beds are slumped,

ii. changing the height of fuel in one or more of said fluidized beds.

8. Apparatus for generating steam comprising:

a. a combustor housing having a plurality of discrete chambers side by side and separated by upright walls of good heat conductive material,

b. a discrete vertically disposed tube bundle in each chamber, conduit means for supplying water to each tube bundle, conduit means for collecting steam from the upper end of each tube bundle,

c. a discrete independently operable downshot air fluidizing grid in each chamber for fluidizing a fuel bed thereabove, means for feeding fuel to each chamber,

d. at least one draw-off hopper below the elevation of said grids with the hopper being tapered to the angle of friction of ash solids so that the solids descend as a mass,

e. means for separately igniting the fluidized bed in each chamber, and

f. means for modulating the amount of steam collected and the steam demand changes to thereby change the rate of

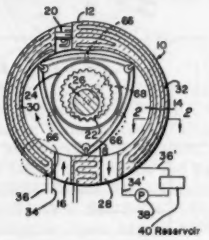
production of steam in said steam bundles in a manner so that one or more nonadjacent beds may be slumped and-/or the height of fuel in one or more of said beds may be changed.

4,072,131

SPARK IGNITION DEVICE AND FUEL INSECTION MEANS FOR INTERNAL COMBUSTION ENGINES

Jerry Pentel, 11 Glenn Drive, Flanders, N.J. 07836

Filed Sept. 14, 1976, Ser. No. 722,879
Int. Cl.[2] F02B *53/10, 53/12, 3/02*
U.S. Cl. 123—8.09 **11 Claims**



1. An internal combustion engine, comprising:
a housing having an arcuate wall;
said housing defining a combustion chamber therewithin;
a piston supported within said housing for movement in at least one direction;
means formed in said housing for evacuating exhaust product from said combustion chamber;
first means for supplying fuel to, and for igniting said fuel in, said combustion chamber; wherein
said first means comprise a first plurality of longitudinal passageways formed within said housing wall, each passageway of said plurality thereof having a given opening which opens internally of said wall onto said combustion chamber; and
said given openings of at least one pair of said passageways open onto said combustion chamber, within a prescribed location in said wall, in adjcency to each other; further including
an electrical conduit, with a spark-gap interruption formed therein, disposed in at least one passageway of said pair;
means for supplying electrical potential to said conduit; and
means for supplying fuel to at least one passageway of said pair.

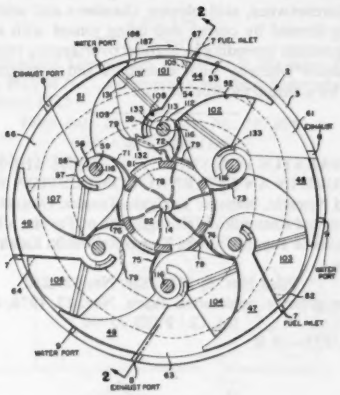
4,072,132

ROTARY INTERNAL COMBUSTION ENGINE

Chester A. Lindros, San Francisco, Calif., assignor to Mighty-Mini Rotary Engine, Limited, San Francisco, Calif.

Filed Aug. 27, 1976, Ser. No. 718,346
Int. Cl.[2] F02B *53/04*
U.S. Cl. 123—8.13 **27 Claims**

1. A rotary internal combustion engine, comprising:
a) an outer housing having a circular inner periphery;
b) a rotor mounted for rotation within said housing, said rotor including
1) a rotor shaft coaxially arranged within said housing and rotatable thereon,
2) a radially extending rotor portion mounted on the rotor shaft and including cavities that extend between the outer periphery of said rotor and the rotor shaft;
c) a piston pivotally mounted in each cavity in said rotor for movement between a position adjacent the outer periphery of said rotor and a position adjacent said rotor shaft, said piston dividing said cavity into a pair of air compression chambers, one of said chambers being a combustion chamber;
d) means cooperatively engaging said rotor, said pistons, and said housing whereby rotation of said rotor in relation to said housing causes said pivotal movement of each said piston in its respective cavity;
e) means for injecting water into one of said air compressed chambers;



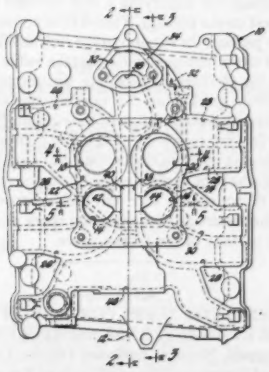
f) means for injecting fuel into one of said air compression chambers, the injection of said fuel following the injection of said water and being effected in each chamber at a time correlated to the positions of the other pistons in their respective cavities whereby combustion of the air-fuel charge in said chamber effects vaporization of the water contained therein and rotation of said rotor.

4,072,133

INTAKE MANIFOLD WITH INTERNAL PASSAGES ARRANGED TO SIMPLIFY CORING

Ralph A. McWhirter, Mount Morris, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 22, 1976, Ser. No. 679,452
Int. Cl.[2] F02M *25/06;* **F02B** *27/00*
U.S. Cl. 123—52 MV **5 Claims**



1. A single level intake manifold for supplying air and exhaust gas to a V-type internal combustion engine having combustion chambers disposed along opposite sides of a longitudinal centerline, said manifold comprising a casting having a pair of generally vertical riser passages transversely spaced on opposite sides of said centerline, a pair of generally horizontal

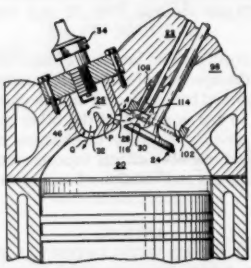
plenum chambers transversely spaced on opposite sides of said centerline and extending longitudinally at a common level, each connecting with the bottom of one of said riser passages, runner passages extending from said plenum chambers laterally away from said centerline, a metered exhaust gas recirculation passage extending longitudinally along said centerline and between said plenum chambers and their connecting riser passages, said metered exhaust gas recirculation passage being joined laterally with said riser passages by short lateral passages therebetween, said plenum chambers and said passages all being formed by coring and being joined with no unconnected portions extending in vertical overlapping relation with one another whereby such chambers and passages may be formed by a single monolevel core.

4,072,134

APPARATUS FOR SUPPLYING RICH AIR/FUEL MIXTURE IN AN INTERNAL COMBUSTION ENGINE

Masaaki Noguchi, Nagoya; Yukiyasu Tanaka, Okazaki; Setsuro Sekiya, and Katsuhiko Motosugi, both of Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 6, 1975, Ser. No. 629,230
Claims priority, application Japan, Nov. 13, 1974, 49-130015
Int. Cl.[2] F02B *23/00*
U.S. Cl. 123—75 B **7 Claims**



1. In an internal combustion engine having a cylinder, a piston, a cylinder head associated with said cylinder and piston to define a combustion chamber, an intake passage for supplying a lean air/fuel mixture into the combustion chamber, an auxiliary passage for supplying a rich air/fuel mixture which opens into said intake passage, a short tube communicating with the auxiliary passage for supplying the rich air/fuel mixture into the intake of the intake passage, an intake valve for controlling the flow of the air/fuel mixture into the combustion chamber and an ignition spark plug for igniting the air/fuel mixture whereby a stratified combustion of the rich air/fuel mixture and the lean air/fuel mixture is ensured in the combustion chamber, the improvement wherein the outlet end of said tube is opened and closed by the back surface of the intake valve and is specially shaped for directing the rich air/fuel mixture only into the vicinity of the electrode of the ignition spark plug by deflection by the back surface of the intake valve.

4,072,135

APPARATUS FOR SUPPLYING A RICH AIR/FUEL MIXTURE IN AN INTERNAL COMBUSTION ENGINE

Masaaki Noguchi, Nagoya; Yukiyasu Tanaka, Okazaki; Setsuro Sekiya, and Katsuhiko Motosugi, both of Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 6, 1975, Ser. No. 629,231
Claims priority, application Japan, Nov. 13, 1974, 49-130016
Int. Cl.[2] F02B *23/00*
U.S. Cl. 123—75 B **6 Claims**

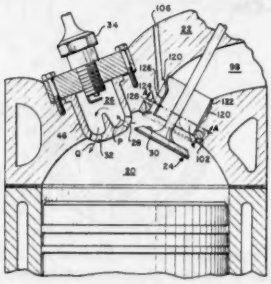
1. An apparatus for supplying a rich air/fuel mixture in an internal combustion engine having at least one combustion chamber comprising:

a cylinder head having an inner surface defining part of the combustion chamber and also having an air/fuel intake passageway communicating with the combustion chamber at the air/fuel mixture intake;

a spark plug having its spark gap protruding into the combustion chamber;

an intake valve positioned in the cylinder head for controlling the flow through the air/fuel mixture intake;

a rich air/fuel mixture passage through the cylinder head;



an annular channel formed in the wall of the air/fuel intake passageway, said rich air/fuel mixture passage opening into said annular channel; and

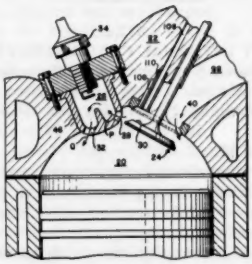
a sleeve inserted in the air/fuel mixture intake passageway, said sleeve having an indented portion for defining a rich air/fuel mixture intercommunication between said channel and the air/fuel mixture intake and for directing the flow of said rich air/fuel mixture toward the spark plug gap, said directed flow being substantially in the plane determined by the valve axis and the spark plug gap, said sleeve cooperating with said annular channel to form a closed annular passage opening into said indented portion.

4,072,136

APPARATUS FOR SUPPLYING RICH AIR/FUEL MIXTURE IN AN INTERNAL COMBUSTION ENGINE

Masaaki Noguchi, Nagoya; Yukiyasu Tanaka, Okazaki; Setsuro Sekiya, and Katsuhiko Motosugi, both of Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 6, 1975, Ser. No. 629,232
Claims priority, application Japan, Nov. 13, 1974, 49-130013
Int. Cl.[2] F02M *23/00*
U.S. Cl. 123—75 B **3 Claims**



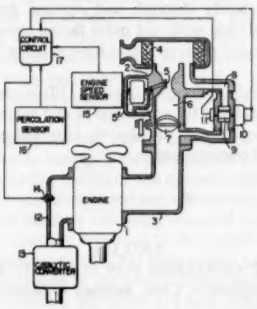
1. In an internal combustion engine having a cylinder, a piston, a cylinder head associated with said cylinder and piston to define a combustion chamber, an intake passage for supplying a lean air/fuel mixture into the combustion chamber, an auxiliary passage for supplying a rich air/fuel mixture which opens in said intake passage, an intake valve for controlling the

flow of the air/fuel mixture into the combustion chamber and an ignition spark plug provided in the combustion chamber, the rich air/fuel mixture supplied from said auxiliary passage being deflected by the back surface of the intake valve and thereafter supplied only into the vicinity of the electrode of the ignition spark plug whereby a stratified combustion of the rich air/fuel mixture and the lean air/fuel mixture is ensured in the combustion chamber, the improvement wherein the auxiliary passage for supplying a rich air/fuel mixture is provided in the cylinder head opening into the inner wall of the lean air/fuel mixture passage, and wherein said auxiliary passage includes an individual, straight tube communicating between the opening in said inner wall and the combustion chamber, said tube terminating at the back surface of the intake valve in the closed position of the valve.

4,072,137
AIR-TO-FUEL RATIO ADJUSTING SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Tadashi Hattori, Okazaki; Akira Takada, Toyota; Takamichi Nakase, Gamagori, and Fumio Sugi, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Apr. 22, 1976, Ser. No. 679,495
Claims priority, application Japan, May 6, 1975, 50-53989
Int. Cl.[2] F02M *33/00, 7/00*
U.S. Cl. 123—119 DB **10 Claims**



1. An air-to-fuel ratio adjusting system for an internal combustion engine comprising:

a. a carburetor connected to an intake pipe of an internal combustion engine for supplying an air-fuel mixture to said engine, said carburetor including a main passage for passing said air-fuel mixture therethrough and a throttle valve disposed in said main passage to control the amount of said air-fuel mixture;

b. a bypass passage for introducing additional air into said main passage;

c. a control valve disposed in said bypass passage for varying the amount of additional air therethrough to compensate the air-to-fuel ratio of said air-fuel mixture;

d. a driving motor connected to said control valve to operate said control valve;

e. air-to-fuel ratio sensing means disposed in an exhaust system of said engine for detecting the composition of exhaust gases emitted from said engine to detect the air-to-fuel ratio of the air-fuel mixture supplied to said engine and generate an air-to-fuel ratio signal;

f. engine speed sensing means for detecting the rotational speed of said engine to generate an engine speed signal;

g. an actuating circuit, connected to said air-to-fuel ratio sensing means and said driving motor, for actuating the driving motor in accordance with said air-to-fuel ratio signal from said air-to-fuel ratio sensing means;

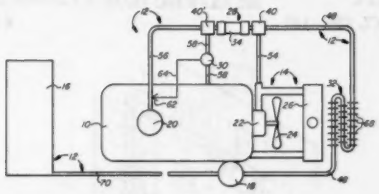
h. percolation sensing means for detecting percolation of the fuel in said carburetor to generate a percolation signal; and

i. an idling control circuit, connected to said actuating circuit, said engine speed sensing means and said percolation sensing means, for stopping the actuation of said driving motor by said actuating circuit when said engine is at an idling operation and percolation of the fuel is not occurring.

4,072,138
FUEL SYSTEM

Clyde C. Hawkins, Greensboro, and Jesse R. Hawkins, Pleasant Garden, both of N.C., assignors to Hawkins Enterprises, Inc., Greensboro, N.C.

Filed July 22, 1976, Ser. No. 707,804
Int. Cl.[2] F02M *31/00*
U.S. Cl. 123—122 E **11 Claims**



1. In combination with a vehicle having an internal combustion engine; and a fuel system for supplying liquid fuel to said engine; said fuel system including a fuel tank, a carburator, and a fuel pump for directing fuel from said tank to said carburator; the improvement comprising:

fuel heating means interposed within said fuel system intermediate said fuel pump and said carburator for heating fuel conducted therethrough during its passage from said fuel pump to said carburator;

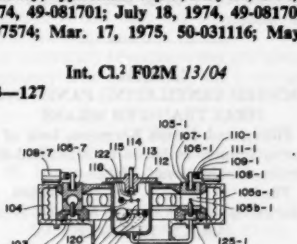
control means for regulating the operation of said fuel heating means in accordance with the temperature of the fuel passing downstream from said fuel heating means to said carburator;

and cooling means within that part of said fuel system intermediate said fuel heating means and said fuel pump for minimizing heat-transfer in an upstream direction through said system from said fuel heating means to said fuel pump.

4,072,139
CARBURETOR

Kuniaki Miyazawa, 1548, Nishioizumi-cho, Nerimaku, Tokyo, Japan

Filed May 5, 1975, Ser. No. 574,813
Claims priority, application Japan, May 24, 1974, 49-057912; July 18, 1974, 49-081701; July 18, 1974, 49-081702; Aug. 27, 1974, 49-097574; Mar. 17, 1975, 50-031116; May 31, 1974, 49-060887
Int. Cl.[2] F02M *13/04*
U.S. Cl. 123—127 **54 Claims**



1. A carburetor comprising

a plurality of cell carburetors,

each cell carburetor having a conduit with an air inlet at one end, a fuel-air outlet at the other end, means for supplying fuel to the air flowing through the conduit, and airflow control means for providing only two sizes of air passageways through the conduit,

manifold means for combining the fuel-air mixtures from said outlets, and

controller means which keeps the internal pressure of said manifold means at a desired value, said controller means including means for controlling said pressure by operating said air-flow control means of the cells to provide the desired pressure.

4,072,140

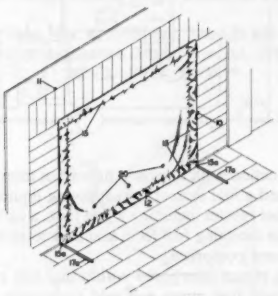
FIREPLACE HEAT LOSS SHIELD

John F. Gallagher, 4109 Hiawatha Drive, Madison, Wis. 54303

Filed Dec. 10, 1976, Ser. No. 749,359

Int. Cl.² F24C *15/10*

U.S. Cl. 126—140 **6 Claims**



1. A fireplace heat loss shield for closing off the opening of the fireplace to prevent substantial introduction of air therein, comprising:

a. a substantially rectangular fireplace opening cover, said cover being formed of a fire resistant flexible woven fabric material which will substantially inhibit the passage of air therethrough; and

b. a rigid frame adapted to engage said cover at the edges thereof to maintain said cover in its generally rectangular shape and to provide vertical support thereto, said cover being unsupported within said frame at the edges of said cover, said frame including legs extending out horizontally from the bottom of said cover which are adapted to provide lateral support to said frame and cover when the heat loss shield is placed against the opening of a fireplace such that the drafting of air into the fireplace will draw said flexible cover firmly against the edges of the fireplace opening to thereby provide a substantially air tight seal over the opening.

4,072,141

PREFABRICATED VENTILATING PANEL INCLUDING HEAT TRANSFER MEANS

Jean-Pierre Fillios, and Joseph Kergueno, both of Saint Germain-en-Laye, France, assignors to Multifluid-Energie, Societe Anonyme, Les Mureaux, France

Filed May 21, 1976, Ser. No. 688,684

Claims priority, application France, May 22, 1975, 75 15904

Int. Cl.² F24J *3/02*

U.S. Cl. 126—270 **8 Claims**

1. A prefabricated ventilating panel for supplying temperature modified air to an enclosure, comprising

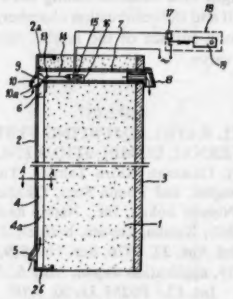
a. a vertical core member (1) formed of heat-insulating material;

b. a vertical planar outer facing member (2) formed of heat conducting material, said facing member being connected in parallel spaced relation with said core member;

c. mean defining at least one generally vertical passage (4) between said facing and core members;

d. means defining an air inlet opening (5) for supplying ambient air to the lower end of said vertical passage;

e. means (7) defining a generally horizontal passage which communicates at one end with the upper end of said vertical passage, said horizontal passage means extending rearwardly completely through said core member and terminating in an air discharge opening, whereby air introduced in said vertical passage via said inlet opening flows successively upwardly through said vertical passage in heat transfer relation with said outer facing panel and through said horizontal passage means for discharge into the enclosure; and



f. means defining a by-pass opening (10) in said outer facing member adjacent the upper end of said vertical passage for introducing ambient air directly into said one end of said horizontal passage means.

4,072,142

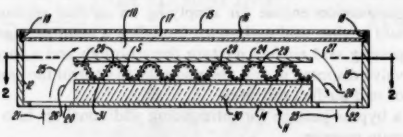
HEAT ABSORBER FOR SOLAR ENERGY

George Lof, Englewood, Colo., assignor to Solaron Corporation, Denver, Colo.

Filed Sept. 2, 1975, Ser. No. 609,230

Int. Cl.² F24J *3/02*

U.S. Cl. 126—270 **3 Claims**



1. In a solar heat collector:

a housing having a cover transparent to solar radiant energy;

a heat absorbing and radiating plate disposed in generally parallel spaced relation to said cover;

foraminous means attached to the underside of said heat absorbing plate in heat conductive and supporting relationship; and

insulation means disposed beneath said absorber plate and said foraminous means for supporting said absorber plate and said foraminous means; and

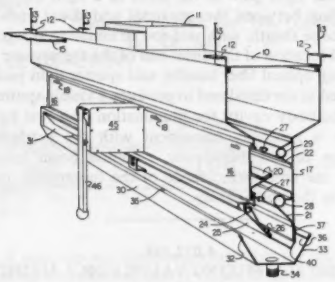
means for guiding a gas to be heated into engagement with the top surface of said heat absorbing plate and into turbulent engagement with the bottom surface of said absorbing plate and with said foraminous means, for conducting heat from said absorbing plate to said gas.

4,072,143

DOUBLE INLET KITCHEN VENTILATOR

Edson C. Gaylord, Wilsonville, Oreg., assignor to Gaylord Industries, Inc., Lake Oswego, Oreg.

Filed Sept. 27, 1976, Ser. No. 726,844
Int. Cl.[2] F24C 15/20
U.S. Cl. 126—299 D 8 Claims



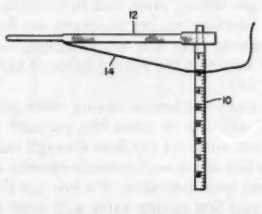
1. A ceiling mounted kitchen ventilator having a double inlet for opposed confluent flows of gases and vapors from underlying cooking equipment, comprising a vertical exhaust duct suspended from said ceiling, grease extracting baffles projecting into said duct from opposite vertical side walls thereof, a grease trough above said cooking equipment suspended beneath the lower end of said exhaust duct, side walls on said trough having upper edges disposed outward from said duct side walls, a damper baffle hinged at the lower edge of one of said duct side walls, said damper baffle having an open position with its lower edge extending into said trough in spaced relation to one of said trough side walls to form an inlet opening for a flow of said gases and vapors on one side of said trough, said damper baffle having a closed position engaging one of said grease extracting baffles on the opposite side of the duct to close the lower end of the duct, and a lower edge on the opposite side wall of the duct extending into said trough in spaced relation to the opposite side wall of the trough to form a second inlet opening for a confluent flow of said gases and vapors from the opposite side of the trough when said damper baffle is in said open position, the closing of said damper baffle shutting off both of said inlet flows of said gases and vapors.

4,072,144

INSTRUMENT AND METHOD FOR MEASURING URETHRAL DEFECTS IN PATIENTS WITH URINARY STRESS INCONTINENCE

Marco Antonio Pelosi, 182 Springfield Ave., Berkeley Heights, N.J. 07922, and Joseph J. Apuzzio, 1005 Fanny St., Elizabeth, N.J. 07201

Filed Jan. 21, 1976, Ser. No. 651,210
Int. Cl.[2] A61B 5/10
U.S. Cl. 128—2 S 3 Claims



1. An instrument for measuring urethral defects, comprising:
a. a urethral probe having a taper toward one end thereof;
b. a flexible thread anchored near the area of commencement of said tapered end to permit a positive connection forming a unitary device; and
c. a straight calibrated measuring rod having, at one end thereof, a means for transverse securement of said rod to the end of said probe opposite to the tapered end,

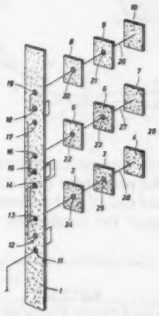
wherein said thread, when held by the examiner during insertion of the probe into the urethra to the opening of the bladder, represents a continuation of the unstrained urethral axis and, further wherein, any deflection of said thread which may occur upon a urethral straining by the patient, corresponds to the degree of deformity of the urethrovesical angle.

4,072,145

BRAIN WAVE SIGNAL SENSOR HEADBAND ASSEMBLY

Jose R. Silva, P.O. Box 1149, Laredo, Tex. 78040

Filed July 19, 1976, Ser. No. 706,446
Int. Cl.[2] A61B 5/04
U.S. Cl. 128—2.1 E 3 Claims



1. A headband for sensing human physiological characteristics and the like, comprising:
an elongated strip of adherent material having a hook surface and a loop surface on opposite sides thereof, said strip being of a length sufficient to encircle the head of the wearer,
at least one electrode of adherent material having a hook surface and a loop surface on opposite sides thereof,
at least one spacer of adherent material having a hook surface and a loop surface on opposite sides thereof,
one of said hook surface and said loop surface of the electrode being plated with an electrically conductive material,
the other of said hook surface and said loop surface of the electrode being pressed against the mating one of the hook surface and the loop surface of said spacer, the other of said hook surface and said loop surface of the spacer being pressed against the mating one of the hook surface and the loop surface of said strip and being shiftable along the length of said strip, and
means for electrically interconnecting said plated surface of said electrode with a measuring and a correlating system.

4,072,146

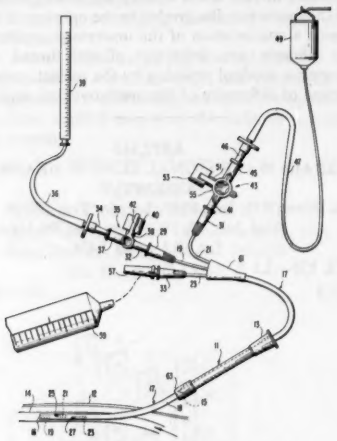
VENOUS CATHETER DEVICE

Randolph M. Howes, 1529 McElderry St., Baltimore, Md. 21205

Filed Sept. 8, 1976, Ser. No. 721,215
Int. Cl.[2] A61B 5/02; A61M 25/00
U.S. Cl. 128—2.05 D 10 Claims

5. A venous catheter device including an elongated, integral flexible catheter tube provided with a distal end portion generally circular in cross-section and having a uniform outer diameter constructed for insertion into and capable of being fed longitudinally of a vein, a plurality of independent lumens

extending through said catheter tube, each of said lumens having a distal terminus adjacent the distal terminus of the catheter tube and defining an opening to the outside of said catheter tube, the distal terminus of said lumens being spaced from each other and all of said lumen termini being within no



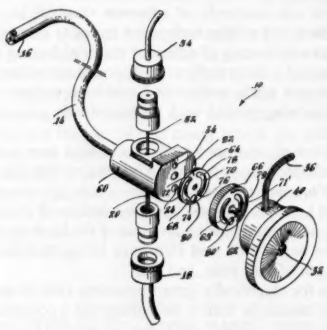
more than about twelve centimeters from the distal terminus of the catheter tube, the proximate ends of the lumens extending beyond the proximate end of said catheter tube and being fitted with a lumen adapter for connection to independent fluid devices.

4,072,147

RADIATION ENDOSCOPE

John H. Hett, Bradenton, Fla., assignor to American Cystoscope Makers Inc., Stamford, Conn.

Filed Mar. 4, 1976, Ser. No. 663,683
Int. Cl.[2] A61B *1/06*
U.S. Cl. 128—006 **7 Claims**



1. A radiation endoscope comprising

an endoscopic sheath having a proximal end and a distal end and sized to investigate a body cavity, said endoscopic sheath enclosing

a. an optical image transmitter extending from the proximal end of the endoscope sheath to its distal end to enable visual observation of a segment of the internal body cavity,

b. a therapeutic energy carrying optical path in the form of a fiber optical bundle selected to transmit radiation energy of a predetermined therapeutic wavelength and a therapeutic power, said optical fiber bundle extending between the proximal and distal ends of the endoscopic sheath, the therapeutic energy carrying optical fiber bundle being selected and sized to enable a therapeutic radiation beam to emerge from the distal end, said therapeutic energy carrying optical fiber bundle further being selected to direct the emerging therapeutic radiation beam for incidence at a predetermined location relative to the distal end for treatment of the visually observable segment of the body cavity, and

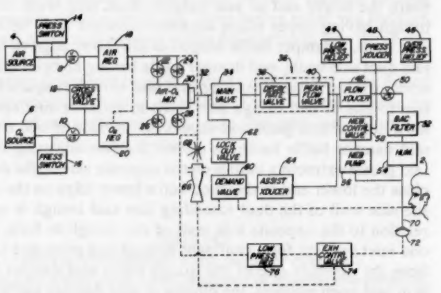
c. a spotter light path in the form of a light carrying rod extending between the proximal and distal ends of the endoscope sheath, with said rod terminating at a generally central location of the distal end of the therapeutic energy carrying optical fiber bundle, said spotter light path being oriented at the distal end to produce a visible spotter beam into the body cavity for illumination of a real light spot which is generally coincident with the predetermined location of the therapeutic radiation beam to visually locate the area of incidence of the therapeutic radiation beam in the body cavity.

4,072,148

MULTISTAGE MIXING VALVE FOR A MEDICAL RESPIRATOR

Ramon Jon Munson, Rialto; Claude Calvert Hurd, and James Weigl, both of Riverside, all of Calif., assignors to Bourns, Inc., Riverside, Calif.

Filed Jan. 3, 1977, Ser. No. 756,448
Int. Cl.[2] A61M *16/00*
U.S. Cl. 128—142.2 **9 Claims**



4. In a medical respirator having nominally constant-pressure air and oxygen sources, conduit means for delivering gas from said sources to a patient, and control means controlling the supply of gas from said sources to said conduit means, wherein the improvement comprises a two-stage mixing valve for accurately setting the air/oxygen mixture of breathing gas delivered to the patient over a range of volumetric flow rates, despite fluctuations in the actual pressures of said sources, said two-stage valve comprising:

first and second mixing valves, each of said mixing valves including air and oxygen inlet ports adapted to receive gas from said sources, an outlet port adapted to be connected to said conduit means, and means for controlling the air/oxygen mixing ratio, said first mixing valve having a greater absolute mixing accuracy but lower volumetric flow capacity than said second mixing valve,

means for adjusting the mixing ratios of each of said mixing valves, and

means between said second mixing valve outlet port and said conduit adapted to sense the pressure in said conduit means and interrupt gas flow through said second mixing valve when the sensed pressure exceeds a predetermined threshold level indicative of a low gas flow condition,

whereby said first mixing valve acts alone during low flow rate conditions to achieve a high absolute mixing accuracy when the pressure differential across said mixing valves is relatively small, and said first and second mixing valves

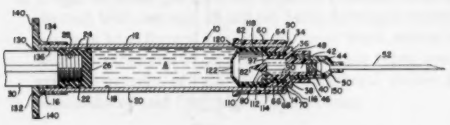
act together during high flow rate conditions to achieve a lower absolute but comparable relative mixing accuracy when said pressure differential is relatively high.

4,072,149

NOSE CAP AND DIAPHRAGM ASSEMBLY FOR INJECTOR

Edward A. Tischlinger, 7 Froghollow Road, East Lyme, Conn. 06333

Filed Aug. 9, 1976, Ser. No. 712,855
Int. Cl.[2] A61M *5/28*
U.S. Cl. 128—218 NV **8 Claims**



1. A nose cap and diaphragm assembly for use in an injector including a cylindrical barrel closed at its rearward end by a slidable plunger and at its forward end by the nose cap and diaphragm assembly, said assembly comprising:

a nose cap, said nose cap having a body portion, said body portion having a central bore therethrough which aligns with the longitudinal axis of the barrel when the nose cap is assembled on the forward end of said barrel, the body portion having a forward and a rearward face, means extending forwardly from the body and in fluid communication with the aforesaid bore adapted to removably receive and mount an injection needle, means extending rearwardly from the body adapted to receive the forward end of the cylindrical barrel, a spike distinct from any injection needle that might be mounted on the forward needle mounting means on the rearward side of the body axially aligned with the body bore and having its point directed rearwardly, means for mounting the spike in such axial alignment, and

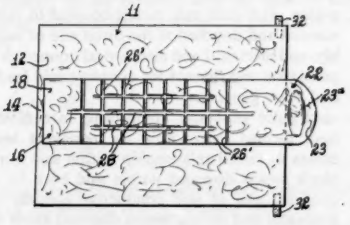
a diaphragm fitted on the rearward side of the body portion and adapted to seal off the forward end of the cylindrical barrel, said diaphragm comprising a cylindrical body having one open end, a flexible and pierceable member attached to and closing off the other end of this cylindrical body, the diaphragm being fitted into the nose cap on the rearward side so that the cylindrical body fits around the spike and the closed end is spaced rearwardly therefrom.

4,072,150

DOUBLE-DUTY DIAPER AND INSERT THEREFOR

Jacob A. Glassman, 1680 Michigan Ave., Miami Beach, Fla. 33139

Filed Nov. 15, 1976, Ser. No. 741,949
Int. Cl.[2] A61F *13/16*
U.S. Cl. 128—284 **16 Claims**



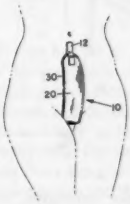
1. A double-duty diaper comprising, in combination, a main diaper including at least one relatively thick substantially rectangular layer of highly moisture absorbent material having a longitudinal central portion, an insert strip of less width than the main diaper also of highly moisture absorbent material super-imposed on said longitudinal central portion, a thin layer of moisture impervious material underlying the absorbent material of the insert strip, means lightly adhering the insert strip to the inner surface of said one layer, means embodied in the insert strip to facilitate at least one end thereof to be folded inwardly to overly an adjacent portion of said insert strip, and means for removing said insert strip from the main diaper without corresponding removal of or impairment of the diapering potential of said main diaper comprising the said insert strip having a size such that at least a portion thereof extends as a pull tab beyond a related edge of the main diaper.

4,072,151

SANITARY NAPKIN

Faye E. Levine, 257 Main St., Eagle Pass, Tex. 78852

Continuation-in-part of Ser. No. 556,195, March 31, 1975, abandoned. This application Mar. 9, 1977, Ser. No. 775,964
Int. Cl.[2] A61F *13/16*
U.S. Cl. 128—290 R **3 Claims**



1. A sanitary napkin for controlling the dischage of body fluid exudate comprising:

pad element having a top absorption means and a bottom absorption means;

backing means attached to the bottom of said pad element, said backing means being an impervious material, said bottom absorption means being a layer of absorptive material in direct contact with said backing means, said top absorption means being a layer of absorptive material in fluid communication with said bottom absorption means;

means for dispersing and preventing localized body fluid exudate saturation of said top absorption layer means and even exudate distribution to said bottom absorption layer means comprising sheet means of an impervious material between said bottom absorption means and said top absorption means, said sheet means separating said entire top absorption means from said entire bottom absorption means, said sheet means being perforated to allow for rapid and even transfer of fluids from said entire top absorption means to said entire bottom absorption means;

adherring means attached to the longitudinal ends of said pad element, said adherring means being a non-irritating adhesive adapted for attachment to the body of the wearer; and

facing means attached to the top of said pad element, said facing means being a fluid pervious gauze-like material, said bottom absorption means and said top absorption means extending essentially the full width and length of said sanitary napkin.

4,072,152

ORTHOPEDIC CRYOSURGICAL APPARATUS

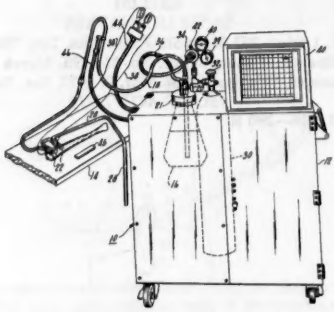
John H. Linehan, 6028 N. Santa Monica Blvd., Whitefish Bay, Wis. 53217

Filed Feb. 23, 1976, Ser. No. 660,157
Int. Cl.[2] A61B *17/36*
U.S. Cl. 128—303.1 **8 Claims**

1. Apparatus for performing cryosurgical procedures on bone tumors comprising:

a source of a cryogenic liquid;

probe means comprising a deformable U-shaped conduit having a pair of parallel, close-spaced arms and an intermediate bent joinder section, one of said arms having an inlet port on the end thereof, the other of said arms having an outlet port on the end thereof, said arms and joinder section having a uniform rectangular cross-sectional configuration along substantially their entire length between said ports, said rectangular cross-section having a minor dimension parallel to the axis of bending of said joinder section and a major dimension normal thereto, said probe means having a pair of U-shaped flattened planar heat transfer surfaces along said major dimension and spaced



apart by said minor dimension, said probe means being formed of lead for being capable of gross configuration changes in said U-shaped flattened heat transfer surfaces out of the planar condition through deformation by hand and for retaining such configuration after deformation;

a supply tube connected to said cryogenic liquid source and to said inlet port of said probe means for supplying the cryogenic liquid through said probe means;

a discharge tube connected to said outlet port of said probe means for discharging the cryogenic liquid; and

temperature monitoring means connectable to the bone tumor for monitoring the temperatures obtained in the bone tumor by the application of said probe means.

4,072,153

POST HYSTERECTOMY FLUID DRAINAGE TUBE

William H. Swartz, 8335 Sugarman Drive, La Jolla, Calif. 92037

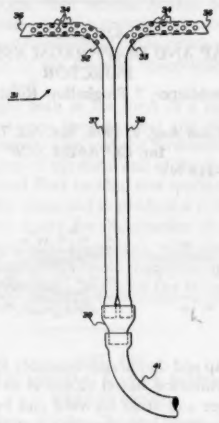
Filed Mar. 3, 1976, Ser. No. 663,460

Int. Cl.[2] A61M *27/00*

U.S. Cl. 128—350 R **1 Claim**

1. A flexible surgical T tube for insertion into the retroperitoneal space of a patient following hysterectomy for removing fluid and debris therefrom, comprising;

a pair of independent tubes connected together in parallel defining a double lumen tube, said tubes diverging at one end and each terminating in an arm thereby defining a pair of independent substantially colinear divergent arms of approximately 1 ½ inches in length generally forming an overall T configuration;



a plurality of drainage ports formed in and disposed around the periphery of each of said arms; and

each of said arms terminating in an open port.

4,072,154

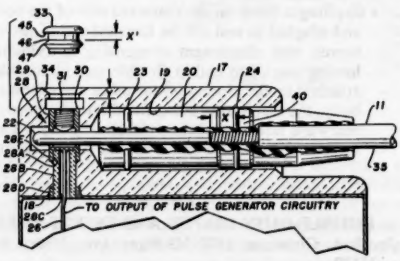
SEALING ARRANGEMENT FOR HEART PACER ELECTRODE LEADS

Jon A. Anderson, New Brighton, and Wendell R. Malin, Edina, both of Minn., assignors to Cardiac Pacemakers, Inc., St. Paul, Minn.

Filed May 28, 1976, Ser. No. 691,032

Int. Cl.[2] A61N *1/36*

U.S. Cl. 128—419 P **1 Claim**



1. In combination, a lead assembly and an implantable pulse generator forming a cardiac pacer apparatus:

a. said lead assembly comprising an elongated generally tubular lead having a conductive element disposed therewithin, with electrode means coupled to said conductive element and disposed at the distal end of said lead assembly, and electrical and mechanical connector means at the proximate end thereof for coupling said lead assembly to said pulse generator;

b. said pulse generator comprising an enclosure having a bore formed therewithin for receiving said connector means in sealed relationship within said bore, connector block means disposed within said bore for securing the proximal end of said conductive element to said pulse generator and sealing means disposed about the periphery of said lead assembly at a point adjacent said proximal end and normally disposed within said bore when said lead is coupled to said connector means;

c. said sealing means including a generally closed cylindrical

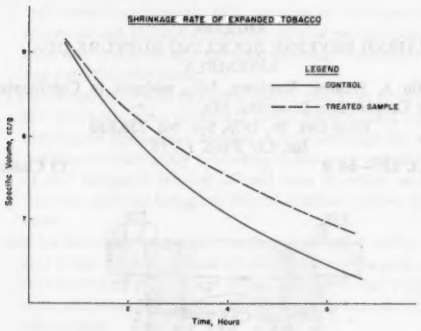
resilient segment arranged generally coaxially of said conductive element with a resilient peripheral sleeve extending outwardly of said cylindrical segment and with a first raised resilient ring disposed about the periphery of said cylindrical segment and disposed between the base of said cylindrical segment at the proximal end thereof and the proximal end of said peripheral sleeve and with a second raised resilient ring extending continuously about the outer periphery of said peripheral sleeve, said resilient peripheral sleeve having axially extending portions arranged in oppositely disposed relationship of said second raised resilient ring; and

d. a rigid terminal pin member disposed generally coaxially thereof, with one end of said pin being lockingly received within a bore formed in said connector block means and with the other end of said rigid terminal pin being spaced axially inwardly of said resilient peripheral sleeve and outwardly of said first raised resilient ring.

4,072,155
STIFFENING OF TOBACCO WITH DIALDEHYDE

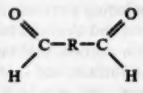
JaYong C. Mc Geady, Brown Summit, and Claude I. Lewis, Greensboro, both of N.C., assignors to Lorillard, New York, N.Y.

Filed July 15, 1976, Ser. No. 705,522
Int. Cl.[2] A24B *3/18*
U.S. Cl. 131—140 P 2 Claims



1. A process for treating whole tobacco which comprises the steps of

a. impregnating whole tobacco with an aqueous solution containing from 5 to 60% by weight of a dialdehyde of the formula



wherein R is an unsubstituted straight or branched chain alkylene radical of the formula $(CH_2)_n$ *n* being from 0 to 6;

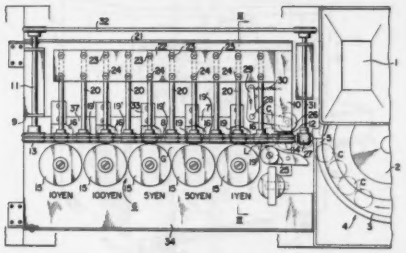
b. causing said dialdehyde to react with said tobacco in the presence of a catalyst effective to promote reactions with amino acids present in said tobacco, thereby to stiffen and increase the filling capacity of the tobacco; and

c. thereafter drying said tobacco.

4,072,156
COIN SORTING DEVICE

Masahiro Abe, Himeji, Japan, assignor to Glory Kogyo Kabushiki Kaisha, Japan

Filed July 20, 1976, Ser. No. 707,003
Claims priority, application Japan, July 25, 1975, 50-90164; July 31, 1975, 50-93454; Apr. 15, 1976, 51-42948
Int. Cl.[2] G07D *3/02*
U.S. Cl. 133—3 F 7 Claims



1. A coin sorting device for use in a coin sorting machine wherein a mixture of several kinds of coins are sorted and classified, said coin sorting device comprising a coin passage having a floor and upstream and downstream ends for aligning the coins fed thereinto in a row; at least one coin propelling belt having large elasticity and a frictional surface for engaging the coins and propelling them along said coin passage from the upstream end to the downstream end thereof; said coin passage floor having sorting hole defining means defining sorting holes at intervals along said coin passage which holes have successively larger dimensions transversely of the coin passage through which coins of different diameters can pass as said coins are propelled past sorting holes with lateral dimensions corresponding to the diameters of the coins; a coin passage lateral perimeter defining means projecting laterally into the coin passage at each sorting hole to a point just short of the edge of the corresponding sorting hole for engaging the peripheral edges of the coins being propelled along the coin passage and displacing said coins in a direction transverse to the coin propelling direction, thereby to cause elastic lateral deformation of the coin propelling belt and to position said coins at positions for passing through corresponding sorting holes; belt holding members on opposite sides of each sorting hole in the direction of the length of the belt for holding the coin propelling belt against displacement laterally from the normal position at last between the sorting holes; and belt pressing members provided at points along the coin passage between said belt members and adjacent said sorting holes for pressing said belt downward at respective positions of the sorting holes; whereby the coin propelling belt is deformed when the coins are displaced laterally by the perimeter defining means due to the friction between the coin propelling belt and the coins and the restoration force generated in the coin propelling belt due to the deformation urges said coins toward said perimeter defining means and said coins are forcedly urged through the corresponding sorting hole by the force of the coin propelling belt on the coins urging the coins against the bottom of the coin passage by the action of the belt pressing members.

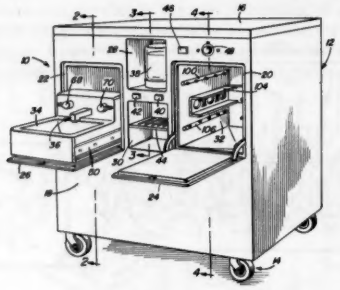
4,072,157
PORTABLE NURSING DEVICE

Roy Layton Wines, Jr., and Roy Layton Wines, III, both of Southampton, N.Y., assignors to Roy L. Wines & Son, Inc., Southampton, N.Y.

Filed Apr. 29, 1976, Ser. No. 681,493
Int. Cl.[2] B08B *3/02*
U.S. Cl. 134—58 R 19 Claims

1. In a portable nursing unit having a plurality of liquid

receiving receptacles and a plurality of flexible conduits connected thereto through which liquid is conducted to and from said receptacles, a mobile cabinet enclosing the conduits and said receptacles, closure means mounted on the cabinet for alternately concealing and exposing at least one of said receptacles when displaced between closed and open positions, control valve means connected to at least one of said conduits



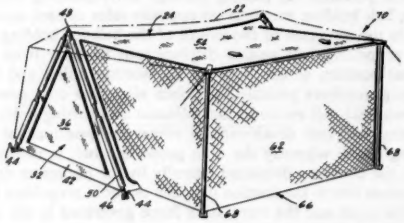
for selectively supplying liquid to said one of the receptacles, means connecting another of the conduits to each of the receptacles for draining waste liquid therefrom, cleaning means mounted within said one of the receptacles and connected to the valve means for cleaning articles loaded into said one of the receptacles, and programming control means connected to the valve means for effecting a cleaning operational cycle within said one of the receptacles.

4,072,158

TENT HAVING VERANDA-STYLE EXTENSION

Thomas J. O'Brien, 4919 N. Magnolia, Chicago, Ill. 60640; David A. Parsons, 4647 W. 47th Place, Hometown, Ill. 60456, and Virginia Ruth Harger, Rte. No. 1, Olympia Drive, Byron, Ill. 61010, assignors to Thomas J. O'Brien, Chicago, Ill.

Filed Mar. 28, 1977, Ser. No. 781,738
Int. Cl.² A45F *1/00*
U.S. Cl. 135—1 R **5 Claims**



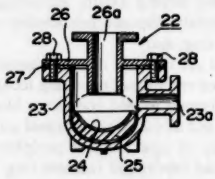
1. In a portable shelter apparatus of the type including interconnected end walls, a floor and side walls and where at least one of the side or end walls can be elevated to a substantially horizontal position, the improvement comprising: a veranda extension comprising an extendable floor portion connected adjacent the shelter's floor along one edge portion thereof, operable to be unrolled from a storage position to a fully extended position exteriorly of the shelter; and a side wall portion characterized as being respectively attached along the exterior perimeters of said extendable floor portion, an elevated wall of the portable shelter, and the adjacent walls of the shelter, whereby said extendable floor and side wall portion cooperate with said elevated side wall to provide the portable shelter with an insect-proof living area of increased size.

4,072,159

EMERGENCY VALVE INCORPORATING THERMAL FOAMABLE PLASTIC MATERIAL

Toyoki Kurosawa, No. 22-1-201, 3-chome, Unoki, Ootaku, Tokyo, Japan (145)

Filed Dec. 19, 1975, Ser. No. 642,522
Claims priority, application Japan, Feb. 22, 1975, 50-21462
Int. Cl.² F16K *17/38*; A62C *37/06*
U.S. Cl. 137—67 **3 Claims**



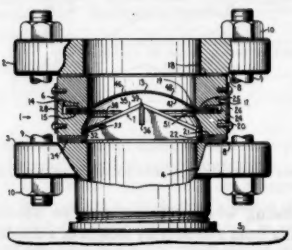
1. An emergency shut-off valve for irreversibly stopping the flow of material in a conduit when an excessive temperature external to the valve is sensed by the valve, said valve comprising a valve casing defining a chamber which communicates with said conduit, and a thermally foamable heat-resistant plastic element residing in said chamber in an amount sufficient to irreversibly expand into said conduit and shut off the flow of material therein, said element in unexpanded condition allowing the flow of material through said conduit; and wherein said thermally foamable heat-resistant plastic element located in said chamber is packed in a stretchable membrane which comprises a shell-like expandable can of a material that will spring into an inflated condition closing off flow upon expansion of said plastic element.

4,072,160

SCORED REVERSE BUCKLING RUPTURE DISC ASSEMBLY

Franklin A. Hansen, Raytown, Mo., assignor to Continental Disc Corporation, Riverside, Mo.

Filed Oct. 26, 1976, Ser. No. 735,830
Int. Cl.² F16K *17/16*
U.S. Cl. 137—68 R **12 Claims**



1. In a safety pressure relief device including a reverse buckling disc having a retaining flange portion and a central bulged portion connected thereto by a transition portion, said bulged portion having a convex and a concave surface, and said disc having a rated pressure on said convex side at which said bulged portion reverses itself for cutting on an adjacently positioned puncturing element, the improvement comprising:

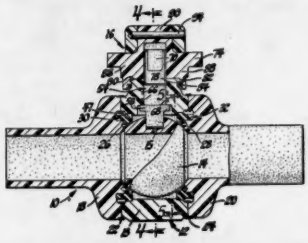
a. a score line formed on the flange portion of said disc; said score line creating a line of weakness in said flange portion whereby pressure applied to said bulged portion which fails to produce cutting on said puncturing element causes said disc to tear along said score line.

4,072,161

SEALING MEMBER FOR VALVE STEMS

E. Frederick Schoeneweis, Coraopolis, and Leonard J. Stephens, Pittsburgh, both of Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 614,207, Sept. 17, 1975, abandoned.
This application Aug. 16, 1976, Ser. No. 714,460
Int. Cl.[2] F16K 5/00
U.S. Cl. 137—68 R 1 Claim



1. A valve assembly comprising:

a valve body having a flow passage for conveying a fluid therethrough;

a valving element in said valve body rotatable about a valve axis between first and second positions for opening and closing said flow passage;

an annular boss on said valve body having a frustoconical outer surface which terminates at an extended portion of said boss and a central opening therethrough;

a valve stem operatively connected to said valving element and extending through said opening to terminate at an extended end thereof outwardly of said valve body, said stem and a wall of said opening defining a potential leakage path therebetween;

a cap mounted on said extended end of said stem to be capable of transmitting rotational force thereto, said cap including an inwardly extending circumferential lip which overlies an outwardly extending collar on a terminal end of said extended portion of said boss to retain said cap thereon, said cap being capable of rotation relative to said boss;

said lip including an exterior surface thereon to define with said frusto-conical surface of said boss a converging space therebetween, said space being in fluid communication with said leakage path through a gap between said lip and said collar;

an O-ring being located within said space and in sealing engagement with said exterior surface and said frusto-conical surface to prevent ingress to said leakage path of contaminant fluids or particles while allowing venting of said fluid at a predetermined pressure if said fluid escapes from said valve body through said leakage path;

a cylindrical sleeve extending from said lip adjacent said frusto-conical surface to define a predetermined distance therebetween to retain said O-ring within said space throughout operation of said valve assembly;

a valve operating fitting including means for mounting said fitting on said cap, such fitting having surfaces thereon capable of receiving a tool for applying a torque through said fitting to said cap for rotation of said valving element; and

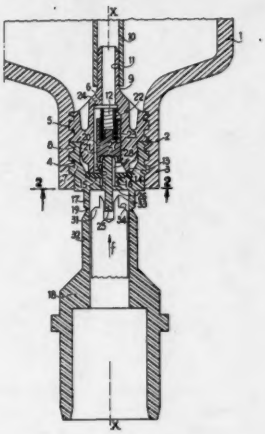
said means for mounting said fitting including a shearable portion thereof capable of shearing when a predetermined torque is applied to said fitting to prevent damage to said valve assembly.

4,072,162

VALVE STRUCTURE FOR A SPRAYING CONTAINER

Pierre Bellehache, Sainte-Adresse, and Yves Le Troadec, Rouen, both of France, assignors to Pont-A-Mousson S.A., Nancy, France

Filed Feb. 20, 1976, Ser. No. 659,877
Claims priority, application France, Mar. 13, 1975, 75 07913
Int. Cl.[2] B65B 3/04, 31/00; F16K 13/04
U.S. Cl. 137—71 5 Claims



1. In a valve for assembling with a container and thereby forming a spraying container structure, the valve comprising a housing, a cover which is provided with a temporary sleeve and is combined with said housing to form a valve body, the housing and the cover defining therebetween a chamber and each defining an axial aperture opening into said chamber, the aperture of the housing being for putting the chamber in communication with the interior of the container and the aperture of the cover communicating with the interior of the sleeve, a sealing element mounted in the chamber, a closure member mounted in said chamber to be movable between an inoperative position spaced away from the sealing element and providing for communication between the chamber and the interior of the sleeve through said cover aperture and an operative position in which it is in sealing engagement with the sealing element for sealing off the cover aperture from the chamber, elastically yieldable means interposed between the valve body and the closure member for applying the closure member against the sealing element in said operative position; the improvement comprising abutment means for temporarily maintaining the closure member in said inoperative position and destructible fixing means for temporarily fixing the abutment means to the valve body.

4,072,163

TAMPERPROOF LOCK WITH SHOCK ABSORBER

Francis R. Byrnes, c/o CCL Co. Inc., P.O. Box 12251, 5250 Belfield Ave., Philadelphia, Pa. 19144

Continuation-in-part of Ser. No. 697,581, June 18, 1976. This application Apr. 19, 1977, Ser. No. 788,710
Int. Cl.[2] E03B 9/06; F16K 35/06, 31/48
U.S. Cl. 137—296 11 Claims

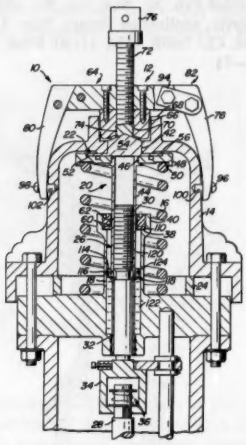
1. In a fire hydrant including a bonnet having an aperture, a housing having an internal chamber, a threaded operating rod extending within the housing chamber coupled to a yoke, and a plunger coupled to the yoke for opening and closing a valve, a tamperproof lock comprising:

a spring mounted at one end on a housing;

power transmitting means threadedly mounted on a threaded operating rod extending within a housing cham-

ber for transmitting power to said threaded rod against said spring;

hydraulic means operatively associated with said power transmitting means for preventing sudden closing of the hydrant valve; and



a swivel plate freely mounted on said power transmitting means for rotational movement thereon, said swivel plate having a contoured hub portion adapted to fit within a bonnet aperture, said hub portion being exposed to the exterior of the bonnet.

4,072,164

DIAPHRAGM OPERATED FLOAT CONTROLLED VALVE

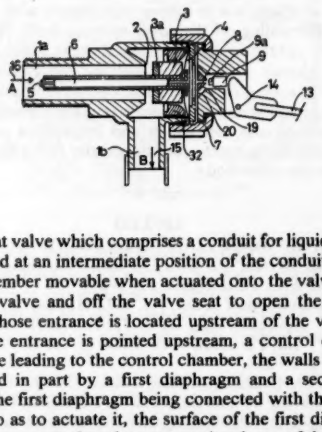
Walter Erich Kaden, 1525, General Hertzog Road, Vereeniging, Transvaal, South Africa

Filed May 13, 1976, Ser. No. 686,247

Claims priority, application South Africa, May 13, 1975, 75/3061

Int. Cl. F16K *31/18*

U.S. Cl. 137—414 **3 Claims**



1. A float valve which comprises a conduit for liquid, a valve seat located at an intermediate position of the conduit, a valve closure member movable when actuated onto the valve seat to close the valve and off the valve seat to open the valve, a passage whose entrance is located upstream of the valve seat and whose entrance is pointed upstream, a control chamber, the passage leading to the control chamber, the walls of which are formed in part by a first diaphragm and a second diaphragm, the first diaphragm being connected with the closure member so as to actuate it, the surface of the first diaphragm being of larger area than the cross sectional area of the conduit encompassed by the valve seat, the second diaphragm carrying a bleed off passage having a seat at its outer end, a bleed off passage closure bung, a float, a float connection linkage providing a mechanical connection between the float and the bung, the linkage adapted to cause the bung to move onto the bleed-off passage seat when the level of the float rises, and the linkage adapted to depress the float below the level of the liquid body if the second diaphragm is deflected outwardly and hence the bleed off passage moves outwardly, while the bung is on the bleed off passage.

4,072,165

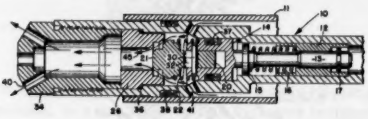
POPPET RELIEF VALVE

Charles Duane Bradley, Jr., Kalamazoo, Mich., assignor to Pneumo Corporation, Boston, Mass.

Filed May 3, 1976, Ser. No. 682,712

Int. Cl.² F16K *17/18*

U.S. Cl. 137—493 **14 Claims**



1. A poppet type relief valve comprising a seat and poppet, means responsive to pressure on one side of said poppet to open said poppet at a predetermined pressure to provide flow through said valve in one direction, and means responsive to pressure on the opposite side of said poppet to open said poppet at a predetermined pressure to provide flow through said valve in the opposite direction, including an actuator for said poppet operative to pull said poppet from said seat at a predetermined pressure, and a lost motion connection between said actuator and poppet, said lost motion connection comprising a pin and slot.

4,072,166

VALVE APPARATUS FOR DEEP DRILLING

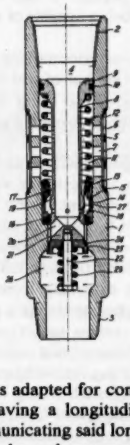
Wladimir Tiraspolsky, 69 avenue Victor Cresson, 92130 Issy-les-Moulineaux, and Roger Francois Rouviere, Quartier les Ribas, 13770 Venelles, both of France

Filed Mar. 23, 1976, Ser. No. 669,523

Claims priority, application France, Mar. 27, 1975, 75 09608

Int. Cl.² E21B *41/00*

U.S. Cl. 137—496 **10 Claims**



1. A valve apparatus adapted for connection in a drill stem comprising a body having a longitudinal fluid passage and lateral openings communicating said longitudinal passage with the exterior of said body; a sleeve member slidably mounted within said body between a first position in which fluid may flow between an upper portion of said longitudinal passage and said lateral openings, and a second position in which said fluid is prevented to flow between said passage and said lateral

openings, said sleeve member being movable from said first to said second position in response to an increase of the flow from said passage to said lateral openings above a predetermined flowrate; biasing means between said body and said sleeve member for urging said sleeve member towards said first position; valve means connected to said sleeve member for preventing flow of said fluid between upper and lower portions of said longitudinal passage when said sleeve member is in said first position while allowing substantially unrestricted flow when said sleeve member is in said second position; and piston means on said sleeve member sensitive to the difference between the pressure in said passage and the pressure outside said body when said sleeve member is in said second position for maintaining said sleeve member in said second position when said difference exceeds a predetermined value.

4,072,167

CHECK VALVE WITH TORSION SPRING AND METHOD OF ASSEMBLY

Cyril W. Habiger, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 19, 1975, Ser. No. 633,350
Int. Cl.[2] F16K *15/04*
U.S. Cl. 137—535 **19 Claims**

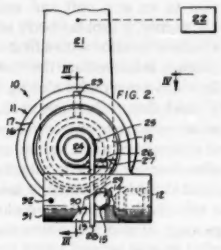


FIG. 2.

17. In a valve of the type comprising a housing having an inlet and an outlet defined therein, a seat defined in said housing between said inlet and said outlet, a ball loosely mounted in said housing and normally disposed on said seat for preventing fluid flow from said inlet to said outlet, torsion spring means having a first end thereof extending transversely relative to a longitudinal axis thereof and operatively engaging the periphery of said ball but otherwise unattached therewith for biasing the same against said seat under a predetermined closing force and for permitting unseating thereof from said seat to permit said inlet to communicate with said outlet when the force of said fluid in said inlet exceeds said predetermined closing force and stop means independent of said spring means secured to said housing and disposed in blocking relationship across said outlet on a downstream side of said ball for preventing said ball from moving therepast and for limiting movement of the first end of said spring means.

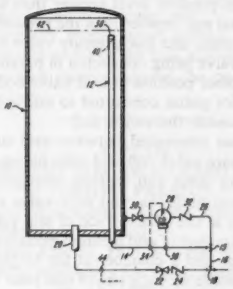
4,072,168

DUAL STANDPIPE ARRANGEMENT SUPPLEMENTING A WATER SUPPLY SYSTEM

James D. Wittenmyer, 853 Granada Drive, Greenwood, Ind. 46142

Filed Nov. 10, 1976, Ser. No. 740,535
Int. Cl.[2] E03B *5/00*
U.S. Cl. 137—567 **12 Claims**

1. For use in connection with a water supply system wherein pumping means draws water from a source and supplies it to various consumers by way of a main and branch lines from a main, a supplement to said supply system including a tank forming a first large standpipe for storage of water, a second smaller standpipe, said second standpipe being positioned within said first standpipe to project upwardly from its bottom to a level approaching but spaced from the top of said first standpipe, a distribution line one end of which opens into the bottom of said first standpipe and the other end of which is arranged to connect to said main, the lower end of said second standpipe, which opens from the bottom of said tank, having coupled thereto one end of a first flow line the opposite end of which is arranged to connect to said main, said second standpipe providing means through which water may be delivered to fill or replenish the supply of water in the interior of said first standpipe, said distribution line providing means for the



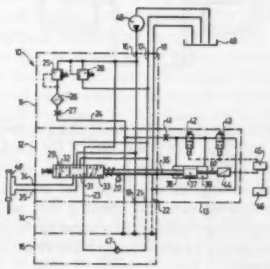
delivery of water from said first standpipe when the water therein reaches a predetermined level, and said second standpipe having in operative connection therewith means responding to the sensing of the water pressure in the related main, as represented by the level thereof in the second standpipe, to induce the delivery of water from said first standpipe to said main in a manner and under conditions to maintain the supply in said main and at a predetermined level of pressure such as required to satisfy the various consumers.

4,072,169

HYDRAULIC CONTROL SYSTEM

Joachim Heiser, Stuttgart; Rainer Hoheisel, Aldingen; Heinz Flaschar, Asperg; Heinz Gand; Heinz Kleinschmidt, both of Stuttgart; Konrad Bräunlinger, Schwieberdingen; Klaus Sopha, Stuttgart; Roland Schempp, Abstatt, and Hermann Sanzenbacher, Heimsheim, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed July 6, 1976, Ser. No. 702,860
Claims priority, application Germany, July 29, 1975, 2533829
Int. Cl.[2] F15B *13/043*; F16K *11/07*
U.S. Cl. 137—596.13 **7 Claims**



1. A hydraulic control system connectible to a pair of output lines, said system comprising:

a source of fluid having a high-pressure side and a low-pressure side;

means including a low-pressure limiting valve for maintaining a predetermined low-pressure differential between its input and output sides;

means including a main valve connected to said lines, said sides, and said low-pressure valve and having a valve body displaceable from an end position for connecting each of said lines to a respective one of said sides and disconnecting said low-pressure valve from one of said sides and another position for disconnecting said lines from said sides and connecting said low-pressure valve across said sides;

means including a medium-pressure limiting valve having an input connected to said high-pressure side and an output for maintaining pressure at its output below a predetermined medium-pressure level greater than said low-pressure differential and smaller than the pressure differential between said sides, said low-pressure valve and said medium-pressure valve being connected in parallel across said sides in said other position of said valve body;

a differential pilot piston connected to said valve body and jointly displaceable therewith; and

pilot-valve means connected between said output of said medium-pressure valve and said pilot piston for hydraulically actuating same and thereby displacing said body between its said positions, said pilot-valve means including a chamber at the smaller face of said piston and connected to said output of said medium-pressure valve, a pair of pilot valves, and a chamber at the larger face of said piston connectable through one of said pilot valves to said low-pressure side and through the other of said pilot valves to the other chamber of said piston.

4,072,170

PRESSURE-RELIEVING DEVICE FOR STEAM GENERATORS AND THE LIKE

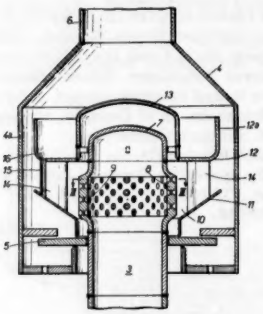
Max Sagner, Paris, and Jacques Souquet, Le Chesnay, both of France, assignors to Bertin & Cie, Plaisir, France

Filed June 3, 1976, Ser. No. 692,517

Claims priority, application France, June 3, 1975, 75 17249

Int. Cl.[2] F01N *1/14*; F15D *1/08*

U.S. Cl. 137—599 **7 Claims**



1. A fluid discharge system for relieving pressure in a high-pressure steam boiler or like reservoir, of the kind comprising a discharge fluid collecting flue hood and a valve-controlled exhaust conduit having an upstream end connected to said reservoir and a downstream end opening into said hood, said conduit and hood being mechanically separate from each other by a break in continuity to allow some relative movement upon fluid action thereon,

wherein the improvement comprises the provision of an air ejector assembly overridden by said hood and fluidically associating the same to said exhaust conduit, said assembly comprising

a nozzle device fitted at said exhaust conduit downstream end and designed to issue pressure fluid therefrom in thrust-balanced high-velocity jet form, and

a duct device opening inside said hood and registering with said nozzle device, whereby the high-velocity jet issuing therefrom entrains air through said duct device and thence through said hood.

4,072,171

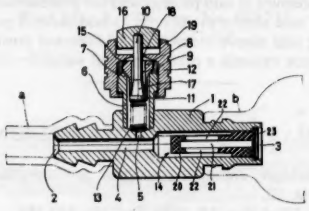
PRESSURE CONTROL VALVE FOR A SPHYGMOMANOMETER

Shizumasa Nakazawa, 2-10-26, Toneri, Adachi, Tokyo, Japan

Filed Sept. 14, 1976, Ser. No. 723,169

Int. Cl.[2] A61B *5/02*

U.S. Cl. 137—599.2 **7 Claims**



1. A pressure control valve for a sphygmomanometer comprising a housing provided with an air passage having one end adapted for connection to an arm cuff and another end for connection with an air supply, a tubular body secured to said housing and having a hollow interior with a first end communicating with said air passage intermediate the ends thereof and a second open end, first valve means for closing said open end of the tubular body, said first valve means having a bore therein constituting an air passage having a first end in communication with ambient atmosphere and a second end in communication with the hollow interior of the tubular body, a second valve means loosely and slidably mounted in said bore in said first valve means for selectively opening and closing said second end of the air passage in said first valve means, external actuator means coupled to said second valve means and slidably actuated to displace the second valve means in said first valve means, spring means acting on said second valve means for closing said second end of the air passage in said first valve means, and a threaded member screwed on said tubular body for engaging said first valve means to hold the same in closed position against the open end of the tubular body, said second valve means including a portion bearing against said first valve means in the closed position of said second end of the air passage in said first valve means, said spring means acting on said first valve means through said portion on said second valve means to urge the first valve means in a direction tending to open said second end of the tubular body.

4,072,172

PNEUMATIC TIMING DEVICE

Jean Gachot, 26 bis, Avenue de Paris, Soisy-Sous-Montmorency, Val d'Oise, and Siméon Lekarski, 138, Boulevard de la Republique, Saint-Cloud, Hauts-de-Seine, both of France

Filed Feb. 17, 1976, Ser. No. 658,864

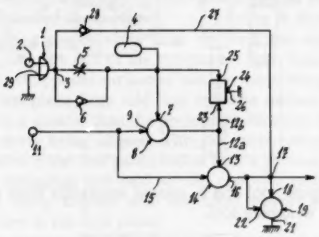
Claims priority, application France, Feb. 27, 1975, 75 06151

Int. Cl.[2] G05B *11/44*

U.S. Cl. 137—624.2 **6 Claims**

1. In a pneumatic timing device comprising an inlet for receiving an instantaneous signal, an outlet for delivering a time-delay signal, a restrictor mounted in series with the inlet and a capacitance for receiving the instantaneous signal aforesaid through said restrictor in order to ensure that the pressure within said capacitance attains a predetermined threshold value at the end of a predetermined time interval in order to initiate the appearance of the time-delay signal at the outlet; the improvement comprising a reference inlet in parallel with the first-mentioned inlet and restrictor and capacitance and adapted to receive an adjustable-level signal and connected to the outlet through first blocking means, means for comparing the pressure existing within the capacitance with the adjusta-

ble-level signal of said reference inlet and for changing stage so as to deliver a comparison signal when said pressure becomes higher than said adjustable-level signal, means for applying said comparison signal to the first blocking means for releasing said first blocking means thereby to permit said adjustable-level signal to proceed to said outlet to produce said time-delay signal, the comparator being so arranged as to ensure that its output signal passes from a high level to a low level at the moment of reversal, and a controlled leakage stage for cooperating in the production of said low-level signal, said stage being so arranged as to ensure that the leakage flow rate is sufficiently high to permit a practically instantaneous appearance of the low-level signal and sufficiently low to ensure that said signal remains prior to reversal at a sufficiently high level to maintain the first blocking means in the locked condition, the controlled leakage stage comprising a differential valve which is subjected on the one hand to the pressure prevailing within the capacitance and on the other hand to the reference pressure and which is adapted to move when the first pressure aforesaid exceeds a predetermined fraction of the second pressure whereupon a leakage is opened in the outlet circuit of the comparator prior to said moment of reversal.

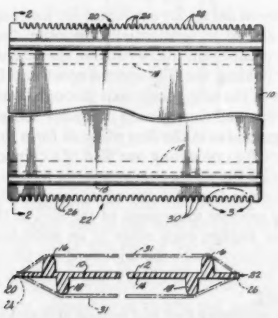


4,072,173

WEAVING BOARD

Allan H. Markowitz, 2650 Country Club Drive, Glendora, Calif. 91740, and Matilda Macknin, 9514 E. Kennerly St., Temple City, Calif. 91780

Filed Mar. 30, 1977, Ser. No. 782,777
Int. Cl.[2] D03D *29/00*
U.S. Cl. 139—34 **20 Claims**



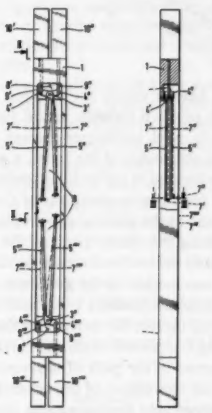
1. A weaving board comprising:
- a generally planar base having opposed first and second surfaces, the base having longitudinally spaced apart first and second edges extending across the width of the base;
- a pair of first ridges spaced apart longitudinally and projecting from the first surface of the base;
- a pair of second ridges spaced apart longitudinally and projecting from the second surface of the base;
- the first and second ridges being substantially continuous across the width of the base;
- a first series of laterally spaced apart grooves formed in the first edge of the base;
- a second series of laterally spaced apart grooves formed in the second edge of the base;
- the width of each groove being greater than the spacing between adjacent grooves in each series;
- a pair of laterally spaced apart elongated first flanges extending longitudinally along opposite edges of the base and projecting from the first surface thereof beyond the remote edges of the first ridges; and
- a pair of laterally spaced apart second flanges extending along opposite edges of the base and projecting from the second surface thereof beyond the remote edges of the second ridges.

4,072,174

ARRANGEMENT FOR PRODUCING SELVAGE IN WOVEN FABRICS

Theodor Wagner, Reutlingen, Germany, assignor to Firma C.C. Egelhaaf, Reutlingen, Germany

Filed June 22, 1976, Ser. No. 698,712
Claims priority, application Germany, June 25, 1975, 2528246
Int. Cl.[2] D03D *47/40*
U.S. Cl. 139—54 **3 Claims**



1. In a weaving machine having a plurality of healds operatively mounted therein, an arrangement for producing selvages for woven fabrics, comprising in combination,
- a frame having an upper and a lower transverse beam,
- means for feeding a plurality of selvage threads,
- a plurality of guide needles arranged in pairs,
- a pivot shaft mounted in the frame for each pair of guide needles, the needles of each pair being of different lengths and being respectively pivotally mounted via their corresponding pivot shaft on said frame, at respective upper and lower locations thereon,
- a lever projecting from each guide needle,
- each needle having an eye through which a selvage thread is adapted to pass, so that a selvage thread is received from said selvage thread feeding means and is independently guided by each guide needle,
- the needles of each pair being mounted in staggered fashion on said transverse beams so that the selvage threads positively guided and swung out by said needles do not interfere with each other during the weaving process,
- a plurality of individual electromagnetic means respectively mounted on said upper and lower transverse beams, and means operatively connecting each electromagnetic

means to the lever of its respective needle for controlling the pivotal movement thereof.

4,072,175

LOOM WITH MEANS FOR SHED FORMING

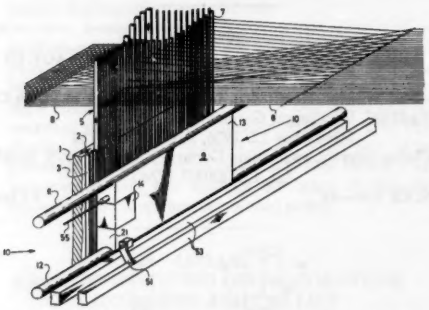
Vojtech Buran, and Vladimir Horn, both of Brno, Czechoslovakia, assignors to Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi, Brno, Czechoslovakia

Filed Mar. 29, 1976, Ser. No. 671,588

Claims priority, application Czechoslovakia, Mar. 28, 1975, 2147/75

Int. Cl.[2] D03C *13/00, 17/06;* **D03D** *47/26*

U.S. Cl. 139—455 **25 Claims**



1. In a loom having means for forming and progressively feeding a sheath of warp threads, means for forming sheds in the warp threads, said last-named means comprising a bed extending across the width of the loom, a plurality of parallel guiding grooves formed in the bed, a plurality of healds having carrier parts, at least the carrier parts of the healds being displaceably mounted in the guiding grooves in the bed, a mechanism for controlling the carrier parts of the heald, a guideway disposed parallel to the bed, and means for displaceably mounting the control mechanism in the guideway, the improvement wherein the control mechanism comprises a selecting magnet supported directly therein for movement therewith, the selecting magnet being cooperable with the carrier parts of successive healds disposed in the path of movement of the selecting magnet during the movement of the control mechanism in the guideway for selectively displacing the carrier parts of such healds.

4,072,176

AUTOMATIC WIRE HANDLING AND WRAPPING APPARATUS

Lindsay Carlton Friend, Camp Hill, Pa., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Jan. 24, 1977, Ser. No. 761,696

Int. Cl.[2] B21F *15/00*

U.S. Cl. 140—93 R **34 Claims**

1. A wire wrapping apparatus for interconnecting electrical terminals comprising:

a rotary wire wrapping tool;

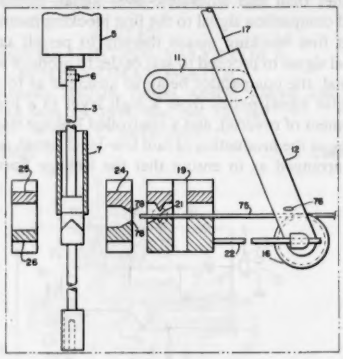
a means for feeding insulated wire of an indeterminate length to said tool;

means for receiving and loading said wire on said tool including clamp means separate from but adjacent said tool;

stripping means separate from but adjacent said tool for removing the wire insulation;

cutting and gripping means for cutting to length and securing sequentially alternate ends of the wire; and

said cutting and gripping means is mounted for rotation about an axis offset from and adjacent to said rotary wire



wrapping tool and is rotated separately from said rotary wire wrapping tool.

4,072,177

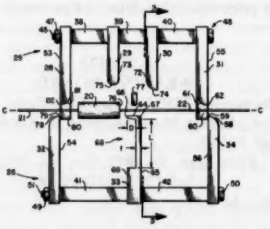
DIE SET FOR FORMING AXIAL LEADS OF ELECTRICAL COMPONENT INTO HAIRPIN LEAD PATTERN

Donald H. Daebler, Huntsville, Ala., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Dec. 20, 1976, Ser. No. 752,507

Int. Cl.[2] B21F *1/00*

U.S. Cl. 140—105 **3 Claims**



1. An improved die set for a machine for forming component leads which extend in substantially opposite directions from the body of a component into a pattern; the machine including structure for holding the dies spaced apart in a first plane on opposite sides of the component axis through component leads in the first plane and facing each other for subsequent movement and engagement in the first plane to form the component leads, structure for contacting one lead of a component located between the dies for aiding in temporarily fixedly securing the position of the one lead and the component body, and means for providing relative movement of the dies in the first plane such that they engage each other in an extended position to form the component leads; the improved die set being adapted for forming the component leads into a hairpin lead pattern, and comprising:

a first die comprising first and second elongated finger members having one end held by the holding structure so as to be in a substantially parallel spaced apart relationship in the first plane, the other ends thereof for contacting a component body and the one lead thereof, respectively, being curved convexly toward the component axis in the first plane; and

a second die comprising a third elongated finger member which is a forming anvil that is held on one end by the holding structure so as to be substantially parallel to said

first and second members, the other end thereof being adjacent the component axis, said anvil having in the first plane portions of first and second opposite surfaces that are adjacent the other end thereof, said first opposite surface having an opening formed in said anvil that is spaced a prescribed distance from said other end thereof and being dimensioned for receiving therein a portion of the component body spaced toward the other end of said anvil from a second plane that is orthogonal to the first plane through the component axis;

the contacting structure of the machine pressing the one lead against the other end of said anvil with one point on the perimeter of the component body being in the first plane and being spaced away from said first and second members with one end of the component body being adjacent said first opposite surface of said anvil and being spaced in the first plane from said first opposite surface a distance which is greater than the prescribed distance; the component body being aligned with the other end of said first member in the first plane and at least a portion of the one lead extending past said second opposite surface of said anvil being aligned with the other end of said second member in the first plane;

relative movement of the dies in the first plane causing the other ends of said first and second members to contact the component body and the one lead, respectively, and to move beyond the other end of said anvil on opposite sides of the latter such that said first and second members press a portion of the component body into said opening in said anvil and the one lead adjacent to said second opposite surface of said anvil, respectively, to form the component leads into a hairpin lead pattern in which the leads are substantially parallel to each other adjacent to the other end of the component.

4,072,178

DEVICE USED FOR DETACHING THE BEADS OF A TIRE FROM THE WHEEL RIM

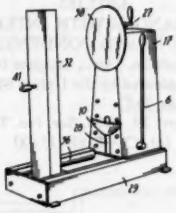
Francis Du Quesne, Gemzenstraat 13, 2610 Wilrijk, Belgium

Filed Dec. 29, 1976, Ser. No. 755,418

Claims priority, application Belgium, Jan. 16, 1976, 254758

Int. Cl.² B60C *25/08*

U.S. Cl. 157—1.17 **7 Claims**



1. Device for detaching the beads of a tire from a wheel rim, comprising a base, on one end of this base an upright fixed frame, on the other end of this base an upright mobile backing support against which one side of the wheel bears and slideable towards said fixed frame, means for blocking said support on said base, a pressure cylinder pivotally suspended in a vertical plane in a slide adjustable in height and mounted in the fixed frame, means to limit the tumble movement of said pressure cylinder, a pressure plate fixed to the free end of the pistonrod of said pressure cylinder and capable of moving towards said support in order to detach the adjacent bead of the tire, means to displace in height said slide with the pressure cylinder in order always to locate the pressure plate as close as possible against the peripheral edge of the wheel rim whatever the diameter of the wheel, whereby the pressure plate may follow the shape of the wheel rim, a stabilizer shield facing said fixed frame and destined to support the upper part of the other side of the wheel, and means to move said shield towards said backing support

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4,072,179

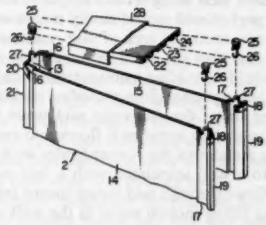
STRUCTURE ADAPTED TO BE SUCCESSIVELY DRAWN AND TELESCOPED

Han-Ichiro Naito, 15-1002, Wakaba-1-chome, Shinjuku, Tokyo, Japan

Filed Dec. 23, 1976, Ser. No. 754,057

Int. Cl.² E05D *15/06*

U.S. Cl. 160—197 **14 Claims**



1. A telescopable paritition comprising:

a plurality of partition members all of substantially the same size and configuration and each in sheet form and each having a pair of spaced opposing partition faces joined together along one respective side of each and unjoined at their other sides,

each said partition member having the spacing between its opposed faces increasing gradually from its joined edges toward its unconnected edges to thereby permit telescoping of one of said member into the next,

guide means for supporting said partition members and permitting movement of said members between a first drawn position in which the joined sides of one said member lie adjacent to the unconnected sides of an adjoining member to a second telescoped position in which said joined sides of said one member lie adjacent to said joined sides of said adjoining member,

and means for limiting the distance between said joined sides of a pair of adjoining members to a predetermined amount when said members are telescoped one into the other.

4,072,180

PROCESS AND MOULD FOR CASTING MULTIPLE ARTICLES

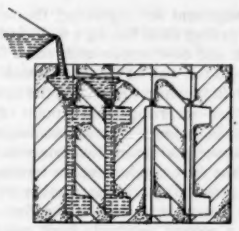
Frederick Herbert Hoult, Sheffield, England, assignor to W. H. Booth & Co. Limited, Great Britain

Filed Feb. 17, 1976, Ser. No. 658,542

Claims priority, application United Kingdom, Feb. 22, 1975, 7528/75

Int. Cl.² B22C *9/02, 9/20;* B22D *35/04*

U.S. Cl. 164—130 **10 Claims**



1. A process of casting molten metal, comprising the steps of securing in side-by-side relationship a number of mould sec-

tions to form a mould, each formed with generally vertically disposed cavity means having ingate means communicating with an integral part of the mould section adapted to form part of a runner-feeder having a horizontally disposed axis throughout its length, and the generally vertical mould cavities are disposed in side-by-side relationship in the horizontal direction, providing a weir in the runner-feeder between longitudinally adjacent mould cavity means, side walls of of longitudinally adjacent weirs facing each other and combining to form a well in the runner-feeder above said ingate means and in close proximity to the top of the cavity means so that the depth of the mould material between the well and the cavity means is as small as possible thereby ensuring vertical feeding of said cavity means, each weir being set at a height so that it is above the uppermost part of said mould cavity means and such that the minimum cross-sectional area of said runner-feeder above the weir is not less than the cross-sectional area of the ingate means of one mould, providing a downstream side wall of each weir with a slope large enough to provide a significant venturi effect to molten metal flowing over said weirs to minimize turbulence in the molten metal as it flows into said wells, and pouring molten metal into the runner-feeder such that molten metal flows into a well associated with a first mould cavity, from where it flows through said ingate means into the cavity means including filling molten metal in the well until it flows with minimum turbulence over the weir and into the well associated with the second mould cavity, and whereby incoming molten metal is supplied across a longitudinally preceeding well as a longitudinally succeeding well and cavity means is being filled, and so on until all the successive wells and cavities have been filled with molten metal, a pool of molten metal being maintained in said wells above said ingate means during filling and solidification of molten metal in said cavity means.

4,072,181

APPARATUS FOR REGULATING THE TEMPERATURE OF A CASTING MOLD

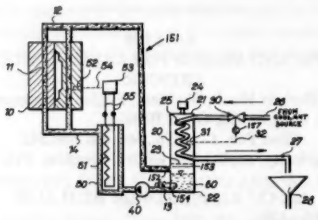
Michal Kostura; Jan Pandula; Absolon Harmansky; Slavomir Smiga, and Stefan Kepic, all of Snina, Czechoslovakia, assignors to Vihorlat, narodny podnik, Snina, Czechoslovakia

Filed Oct. 26, 1976, Ser. No. 735,808

Claims priority, application Czechoslovakia, Oct. 24, 1975, 7193/75

Int. Cl.² B22D *17/32*

U.S. Cl. 164—154 **5 Claims**



1. In an arrangement for regulating the temperature of a casting mold, a casting mold having a wall, first conduit means having upstream and downstream ends and a first portion and extending through the wall of the casting mold for conveying a first volatile fluid to remove heat from the mold wall at a rate related to the then-occurring boiling point of the first fluid, condenser means including a hollow chamber having an upper portion and a lower portion in fluid communication, the upstream end of the first conduit means terminating in a first relatively low point of the lower portion of the condenser means and the downstream end of the first conduit means terminating in a second relatively high point of the lower portion, second conduit means extending into the upper portion of the condenser means for conveying a second cooling fluid through said upper portion, regulatable heater means associated with a first portion of the first conduit means between the upstream end thereof and the casting mold for selectively heating the associated first portion, and pump means serially disposed in the path of the first conduit means for maintaining a serial flow of the first fluid through the first conduit means and the lower portion of the condenser means.

4,072,182

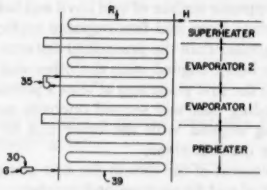
PRESSURE STAGED HEAT EXCHANGER

Dah Yu Cheng, Palo Alto, Calif., assignor to International Power Technology, Inc., Palo Alto, Calif.

Filed Jan. 5, 1977, Ser. No. 756,891

Int. Cl.² F22B *1/00*

U.S. Cl. 165—1 **16 Claims**



13. A method of improving the transfer of energy in a countercurrent heat exchanger from a first fluid to a second fluid, wherein said first fluid is at a higher temperature than said second fluid, said method comprising:

A. preheating the second fluid to a thermodynamic transition point at a pressure substantially below the exit pressure of said second fluid from the heat exchanger,

B. causing the second fluid to enter a low pressure evaporator wherein said second fluid enters a state of partial thermodynamic transition,

C. increasing the pressure of the second fluid to a point which substantially equals the final exit pressure of said second fluid, and

D. causing the second fluid to enter a high pressure evaporator wherein said second fluid continues thermodynamic transition.

4,072,183

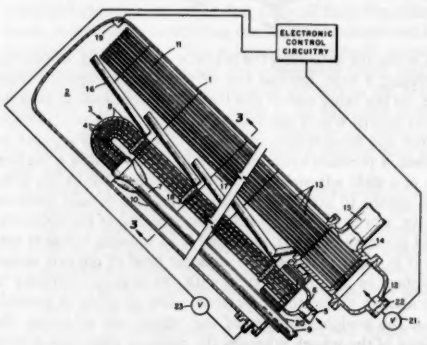
HEAT EXCHANGER WITH INTERMEDIATE EVAPORATING AND CONDENSING FLUID

Arthur P. Fraas, Knoxville, Tenn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 29, 1976, Ser. No. 745,941

Int. Cl.² F28D *15/00*

U.S. Cl. 165—11 **10 Claims**



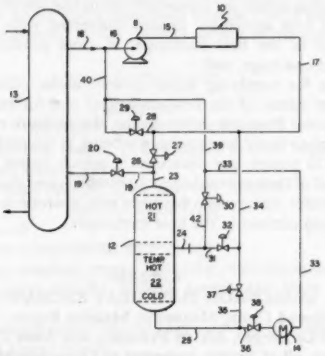
1. A heat exchanger comprising:

a. a shell defining an interior cavity;
b. a first tube bundle disposed within said interior cavity for carrying high temperature primary fluid;
c. A second tube bundle disposed within said interior cavity generally parallel to and at a higher elevation than said first tube bundle, for carrying low temperature secondary fluid;
d. an intermediate fluid having a boiling point between the temperature of tubes in said first tube bundle and tubes in said second tube bundle disposed within said interior cavity such that during operation of said heat exchanger said intermediate fluid vaporizes at the surfaces of tubes in said first tube bundle and condenses at surfaces of tubes in said second tube bundle;
e. a liquid-conducting baffle disposed within said interior cavity in a region between said first and second tube bundles and extending in a direction parallel to said bundles for preventing the direct impingement of secondary fluid onto said first tube bundle in the event of a leak in said second tube bundle, said baffle being adapted for conducting condensed intermediate fluid from said second bundle to said first bundle; and
f. a transverse baffle disposed within said housing and extending in a direction perpendicular to said tube bundles substantially to the periphery of said interior cavity for dividing said heat exchanger into regions of different temperature.

4,072,184
PROCESS AND APPARATUS FOR THE CYCLIC HEATING AND COOLING OF PROCESSING EQUIPMENT

Richard E. Hinkle, Bayshore, N.Y., assignor to American Hydrotherm Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 690,166, May 26, 1976. This application June 14, 1976, Ser. No. 695,808
Int. Cl. F25b *13/00*
U.S. Cl. 165—18 **8 Claims**

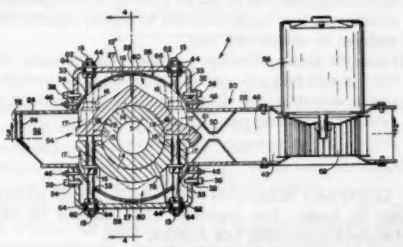


1. An apparatus for heating and cooling user equipment utilizing pressurized water as a heat transfer fluid in a closed system wherein said system includes heating and cooling means for heating and cooling said heat transfer fluid and wherein said apparatus includes at least two storage vessels for storing heat transfer fluid at intermediate temperature levels which comprises:
(a) pump means for passing said heat transfer fluid through said apparatus;
(b) first conduit means for introducing heat transfer fluid from an upper portion of a first heat transfer zone of a storage vessel into said user equipment during a first stage of a heating cycle and for passing heat transfer fluid from a second heat transfer zone of said storge vessel to said user equipment during a first stage of a cooling cycle;
(c) a second conduit means for introducing heat transfer fluid withdrawn from said user equipment into a lower portion of said first heat transfer zone of a storage vessel;
(d) third conduit means for introducing heat transfer fluid from said heating means into said user equipment during a second stage of said heating cycle;
(e) fourth conduit means for introducing heat transfer fluid withdrawn from said user equipment during said second stage of said heating cycle into a lower portion of said heat transfer zone of said second storage vessel and for introducing heat transfer fluid withdrawn from said user equipment into said upper portion of said first heat transfer zone of said storage vessel during a second stage of said cooling cycle;
(f) fifth conduit means for passing heat transfer fluid from said second heat transfer zone of said storage vessel to said heating means;
(g) sixth conduit means for passing heat transfer fluid withdrawn from said user equipment to said heating means during a final stage of said heating cycle;
(h) seventh conduit means for introducing heat transfer fluid withdrawn from said user equipment into said upper portion of said heat transfer zone of said second storage vessel during a first stage of a cooling cycle;
(i) eight conduit means for introducing heat transfer fluid from said cooling means into said user equipment during said second stage of said cooling cycle;
(j) ninth conduit means for passing heat transfer fluid from said first heat transfer zone of said storage vessel to said cooling vessel; and
(k) tenth conduit means for passing heat transfer fluid withdrawn from said user equipment to said cooling means.

4,072,185
AIR COOLING APPARATUS FOR VERTICAL EXTRUDERS

Alden W. Nelson, West Mystic, Conn., assignor to Crompton & Knowles Corporation, New York, N.Y.

Filed Oct. 17, 1975, Ser. No. 623,514
Int. Cl.² **F25B** *29/00*
U.S. Cl. 165—30 **7 Claims**



1. In extrusion apparatus having an extruder barrel, the central longitudinal axis of which is vertical and an annular heat-exchange jacket surrounding the outside of said barrel and comprising heat-exchange fins on its outer periphery lying in spaced parallel planes substantially normal to said axis, wherein the uppermost and lowermost of said fins extend further from said axis than the remaining fins, air cooling means for said jacket comprising:
(a) a hood supported on and surrounding said jacket and comprising:
(1) an inlet portion at one side of said jacket which contains a plenum chamber and an inlet opening between said jacket and said plenum chamber and which extends along the length of said jacket, the horizontal dimension of said inlet opening being substantially less than that of said plenum chamber;
(2) an outlet portion at the opposite side of said jacket which contains an outlet chamber and an outlet opening

between said jacket and said outlet chamber and extending along the length of said jacket; and

(3) a central portion connecting said inlet and outlet portions and being in abutting contact with the outermost of said heat-exchange fins to provide a continuous passage between said inlet and outlet openings; and

(b) means for forcing air into said plenum chamber to create a super-atmospheric pressure therein sufficient for providing a uniform flow of air past said heat exchange fins from one end of the heat-exchange jacket to the other.

4,072,186

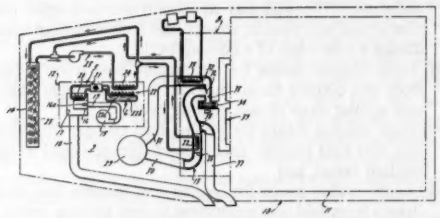
DUAL FUNCTION HEATER CORE

David W. Barton, Birmingham, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Apr. 5, 1976, Ser. No. 674,011

Int. Cl.² F01B *29/10;* **F02G** *1/04;* **B60H** *3/00;* **B61D** *27/00*

U.S. Cl. 165—43 **3 Claims**



1. In an automotive vehicle having a passenger compartment and a Stirling engine outside said compartment, said engine having a closed working fluid circuit, an integrated heat transfer system for both said Stirling engine and compartment, comprising:

(a) an air flow system having a passage in which air is conditioned and conducted to said compartment,

(b) heat rejecting means for said Stirling engine effective to cool a selective zone of said closed working fluid circuit, one portion of said means being disposed to continuously impart rejected heat to the air flowing in said passage, and another portion being disposed to impart rejected heat to ambient air conditions, and

(c) control means effective to either communicate the air flow in said passage conditioned by said one portion with said compartment or dump the air in said passage conditioned by said one portion to ambient conditions.

4,072,187

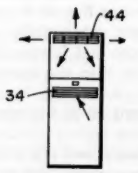
COMPACT HEATING AND COOLING SYSTEM

Robert H. Lodge, Los Angeles, Calif., assignor to Advance Machine Corporation, Los Angeles, Calif.

Filed May 10, 1976, Ser. No. 684,999

Int. Cl.² F24D *13/04;* **F24F** *1/02, 11/02;* **F24H** *9/08*

U.S. Cl. 165—48 **5 Claims**



1. A compact indoor environmental control system comprising:

an elongate thin cabinet,

a removable modular air heating and circulating means slideably supported in said cabinet,

a removable modular air cooling and circulating means slideably supported in said cabinet,

an electric control module removably mounted in said cabinet adjacent to said heating and cooling modules, including plug means for quick connecting and disconnecting of said cooling and heating modules,

said heating and cooling modules being slideably supported to provide air intake and exhaust plenums in the top, bottom, and center of said cabinet whereby said system may be installed to provide air outlet vents in any side or end of said cabinet.

4,072,188

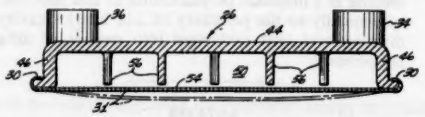
FLUID COOLING SYSTEMS FOR ELECTRONIC SYSTEMS

Edward A. Wilson, and James D. Fredenberg, both of Phoenix, Ariz., assignors to Honeywell Information Systems Inc., Phoenix, Ariz.

Filed July 2, 1975, Ser. No. 592,578

Int. Cl.² H01L *23/34*

U.S. Cl. 165—80 **12 Claims**



1. A cooling system for an electronic system comprising:

a panel,

a connector mounted on said panel,

a micropackage adapted to be removably mounted on said connector,

a heat exchanger having a flexible wall made of heat conductive material and provided with inlet and outlet means for a liquid coolant to permit said coolant to flow through said heat exchanger and in contact with said flexible wall,

mounting means for removably mounting the micropackage and heat exchanger to said connector with the flexible wall of the heat exchanger in close proximity to said micropackage, and

means for supplying liquid coolant under pressure to the inlet means of the heat exchanger and for removing the coolant from the outlet means, the pressure of the liquid coolant in the heat exchanger being in the range of from 1 to 10 pounds per square inch, which causes the flexible wall of the heat exchanger to establish and maintain a heat transfer relationship between said micropackage and the liquid coolant in the heat exchanger.

4,072,189

IMMERSION-TUBE HEAT EXCHANGER

Jean Edmond Chaix, Manosque; Maurice Fajeau, Pertuis; Edmond Le Borgne, Aix en Provence, and Aime Zerouki, Manosque, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Apr. 9, 1976, Ser. No. 675,251

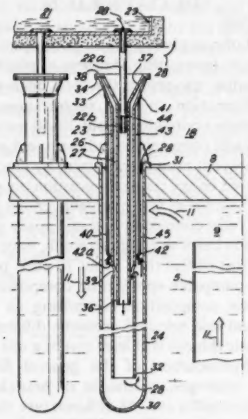
Claims priority, application France, Apr. 18, 1975, 75 12213

Int. Cl.² F28D *7/12*

U.S. Cl. 165—142 **7 Claims**

1. A heat exchanger of the immersion-tube type comprising an outer vessel fitted with a duct for the supply of a primary fluid, a duct for the discharge of said primary fluid after circulation within the vessel, a partition plate for dividing the interior of the vessel into two regions consisting of a lower region at the pressure of the primary fluid and an upper region at the pressure of a secondary fluid to be vaporized by heat transfer with the primary fluid, said partition plate being pierced by holes for the insertion of vertical immersion tubes carried by the plate and reserved for the circulation of the secondary fluid, said immersion tubes being each provided with a pres-

sure tube which is open at the upper end of providing a communication with the region in which the vaporized secondary fluid is collected and closed at the lower end which penetrates into the primary fluid region, in which each immersion tube is provided with an axial duct for supplying secondary fluid in liquid phase within the interior of the pressure tube, wherein said heat exchanger comprises an intermediate tube which is coaxial with the admission duct and a screen mounted within the annular space delimited between the intermediate tube and



the pressure tube, said screen being constituted by a sleeve which is coaxial with the two tubes, the upper end of said sleeve being rigidly fixed to the intermediate tube and the lower end of said sleeve being open so as to delimit up to the full height of the sleeve with the intermediate tube an annular zone filled with stagnant vapor which forms a thermal insulation, said coaxial sleeve which forms a screen having in the vicinity of its lower end a projecting annular flange centering said sleeve by bearing on the external surface of the intermediate tube.

4,072,190

MOTION COMPENSATOR

George M. Raulins, Dallas, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed July 30, 1976, Ser. No. 709,959
Int. Cl.[2] E21B 7/12
U.S. Cl. 166—.5 **27 Claims**

1. A motion compensator comprising:

telescoping mandrel means including interconnected concentric outer tubular housing means and inner sleeve means;

tubular mandrel means disposed between said housing means and said sleeve means;

a pressure baiancing seal system including:

first seal means between said tubular mandrel means and said sleeve means, and

second seal means between said tubular mandrel means and said housing means;

said first and second seal means in conjunction with said telescoping mandrel means and said tubular mandrel means defining a chamber;

an environmental seal system spaced from said pressure balancing seal system including seal means between said tubular mandrel means and said housing means;

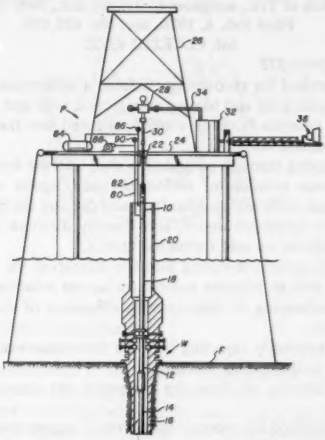
said second seal means and said environmental seal system in conjunction with said housing means and said tubular mandrel means defining an annular cavity;

first port means through said housing means permitting lubricant to be injected to said environmental seal system;

second port means through said housing means to said chamber permitting lubricant to be injected to said pressure balancing seal system; and

communicating means between said annular cavity and the bore of said sleeve means.

26. The method of operating a motion compensator, said motion compensator including tubular mandrel means, tubular housing means telescoped around said tubular mandrel means, a seal system including seal means between said tubular housing means and said tubular mandrel means, and port means



through said housing means opening near said seal means; the method comprising the steps of:

positioning the motion compensator within a well pipe string extending between a stationary underwater wellhead and a floating platform so that the motion compensator can accommodate oscillating movement of the floating platform with respect to the stationary underwater wellhead; and

injecting lubricant through said port means during the operation of said motion compensator.

4,072,191

FIRE FLOOR PROCESS

Richard L. Clampitt, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 586,465, June 12, 1975, abandoned. This application Sept. 21, 1976, Ser. No. 725,305
Int. Cl.[2] E21B 43/24, 33/138
U.S. Cl. 166—261 **9 Claims**

8. A process for the recovery of valuable products from a carbonaceous deposit having a formation permeability value of 2-20 Darcys in which forward combustion can be effected without further treatment and wherein said deposit is penetrated at spaced points by an injection well and a production well which comprises:

a. bringing said deposit at the face of said injection well at ignition temperatures followed by the injection of air to establish a combustion front at the face of said injection well,

b. propagating the resulting combustion front through said deposit by injecting through said injection well a mixture of air, water, and a surfactant at a ratio of from about 300 to about 15,000 scf air/bbl of water and from about 4 to about 10 weight percent surfactant based on the weight of water injected so that the water upon contacting the hot formation vaporizes creating a condensible foam having steam as its gaseous phase, the amount of foam produced being sufficient to generate a resistance factor of at least 5, thereby improving the volumetric sweep efficiency by retarding the mobility of the steam thus generated and

forcing products of said deposit toward said production well, and

c. recovering fluids resulting from the combustion process through said production well.

4,072,192

SULFOMETHYLATED LIGNITE SALT AS A SACRIFICAL AGENT IN OIL RECOVERY PROCESSES

Mohan V. Kudchadker, Houston, and Walter J. Weiss, Sugarland, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Feb. 4, 1976, Ser. No. 655,188
Int. Cl.[2] E21B *43/22*
U.S. Cl. 166—273 18 Claims

1. A method for recovering oil from a subterranean formation containing oil and having an injection well and a production well wherein flooding water is injected into the subterranean formation comprising:

(a) injecting through an injection well into the formation an aqueous solution of sulfomethylated lignite salt in an amount sufficient to adsorb on and occupy the active sites of the formation matrix and thereby diminish surfactant adsorption on said formation matrix,

(b) subsequently injecting into the formation via the injection well an aqueous anionic surfactant solution effective for enhancing oil displacement efficiency of the flooding water,

(c) subsequently injecting into the formation via the injection well flooding water; and

(d) producing oil from the formation via the production well.

7. In a method for recovering oil from a subterranean formation containing oil and having an injection well and a production well wherein an aqueous anionic surfactant solution is injected into the injection well in order to drive the oil to the production well wherein it is produced the improvement which comprises:

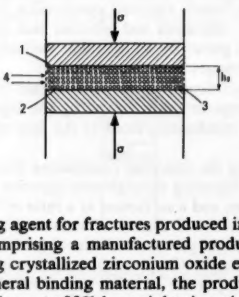
injecting into the injection well in admixture with the surfactant sulfomethylated lignite salt in an amount sufficient to adsorb on and occupy the active sites of the formation matrix and thereby diminish surfactant adsorption on said formation matrix.

4,072,193

PROPPING AGENT AND METHOD OF PROPPING OPEN FRACTURES IN THE WALLS OF A BORED WELL

Jean-Paul Sarda, and Pierre Le Tirant, both of Rueil-Malmaison, France, assignors to Institut Francais du Petrole and Societe Europeene de Produits Refractaires, France

Filed Mar. 19, 1976, Ser. No. 668,480
Claims priority, application France, Mar. 19, 1975, 75 08827
Int. Cl.[2] E21B *43/26*
U.S. Cl. 166—280 15 Claims



1. A propping agent for fractures produced in the walls of a bored well, comprising a manufactured product in granular form containing crystallized zirconium oxide embedded in an amorphous mineral binding material, the product containing, on an oxide basis, up to 85% by weight zirconium oxide ZrO_2, silica SiO_2 in a quantity such that the weight ratio (ZrO_2/SiO_2) is at least equal to 1.5, a quantity of alumina Al_2O_3 such that the weight ratio (Al_2O_3/SiO_2) is from 0 to 1.5, and a quantity of sodium oxide Na_2O such that the weight ratio (Na_2O/SiO_2) is from 0 to 0.04.

4,072,194

PUMPABLE EPOXY RESIN COMPOSITION

Robert Clay Cole, Marlow; Ronney R. Koch, and Joseph Ramos, both of Duncan, all of Okla., assignors to Halliburton Company, Duncan, Okla.

Filed June 18, 1973, Ser. No. 371,100
Int. Cl.[2] E21B *33/14*
U.S. Cl. 166—295 13 Claims

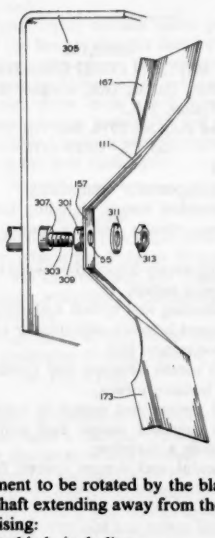
1. A method of completing a well bore penetrating a subterranean formation, comprising the steps of placing in the space between a conduit traversing the well bore penetrating the subterranean formation and the subterranean formation an epoxy composition containing about 20–40 parts by volume of an aromatic diluent composition, wherein said aromatic diluent is selected to prevent premature setting by absorbing heat and to provide a cured epoxy resin composition occupying substantially the same volume as said pumpable epoxy resin; maintaining said epoxy resin composition in said space until said epoxy resin composition cures to a high strength, impermeable matrix with a weight loss of less than about 20 parts per 100 parts by weight of said pumpable epoxy resin composition; said pumpable epoxy resin composition comprising an epoxy resin, a curing agent and said selected aromatic diluent; wherein said selected aromatic diluent is at least one or a mixture containing an aromatic hydrocarbon of the general formula $C_6(R_1)_6$ wherein R_1 is hydrogen, a straight or branched chain alkyl radical, a cycloparaffin radical or a mixture thereof; wherein each alkyl and cycloparaffin radical has about 1–10 carbon atoms; and further wherein at least one R_1 group is said radical.

4,072,195

HOE ATTACHMENT FOR EDGERS

Elmer Carl Carlson, Pearland, Tex., assignor to T & H Mfg. Co., Inc., Pearland, Tex.

Filed July 28, 1976, Ser. No. 709,403
Int. Cl.[2] A01B *45/00*
U.S. Cl. 172—15 7 Claims



1. A hoe attachment to be rotated by the blade shaft of an edger, such blade shaft extending away from the main body of such edger, comprising:

a unitary elongate blade including

(a) a hub portion at the center of said blade, said hub portion having means for accomodating the shaft such that said blade is positioned to one side of the main body of such edger and such that as the blade shaft rotates about a

horizontal axis, said hub portion rotates within a substantially vertical plane,

(b) a hoe portion at either end of said blade, each said hoe portion including a leading edge rotationally in advance of the remainder of the corresponding end of said blade, an end edge at the extreme end of the corresponding end of said blade and forming an acute angle with said leading edge, a hoe face bounded in part by said leading edge and said end edge, and a substantially flat tab portion adjoining said hoe face rotationally at the rear of said hoe face, said hoe face facing to some extent into the direction of rotation such that when said blade is attached to an edger, the junction of said hoe face and said tab portion rotates within a path closer to the main body of such edger than does said leading edge and said tab portion rotates within a path closer to the main body of such edger than does the junction of said hoe face and said tab portion, and

(c) an arm portion intermediate each said hoe portion and said hub portion, each said arm portion forming an angle with said hub portion to the extent that as the blade shaft rotates about a horizontal axis, all parts of both of said hoe portions are to one side of the plane within which said hub portion rotates.

4,072,196

CULTIVATORS

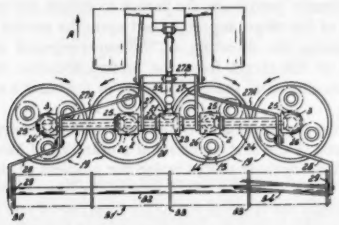
Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed May 8, 1975, Ser. No. 575,831

Claims priority, application Netherlands, May 10, 1974, 7406292

Int. Cl.[2] A01B *33/06*

U.S. Cl. 172—49 **11 Claims**



10. A soil cultivator comprising a frame movable over the ground and soil working means supported on said frame, said soil working means including a plurality of rotors mounted on respective, substantially central shafts, said rotors being positioned side-by-side transverse to the direction of normal travel of said cultivator to work adjoining strips of land and the shafts of adjacent rotors being driven in relative opposite directions, each rotor having a common support that is freely rotatable about a first upwardly extending axis defined by the corresponding central shaft on that rotor, driving means comprising a pinion transmission, being connected to said central shaft, a plurality of soil working members being mounted on said common support and positioned around said central shaft, said members being rotatable about corresponding upwardly extending axes defined by further shafts journalled on said common support, said driving means comprising sun and planet gears that drivenly interconnect said further shafts to said central shaft and the latter extending substantially parallel to said further shafts, said soil working members each comprising a substantially horizontal elongated tine support and at least one tine extending downwardly from said support.

4,072,197

DISC CULTIVATOR WITH CURVED SPACER STRUCTURE

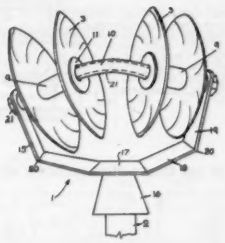
Percy Boyd-Dunlop, Seafield, R.D. 1, Howick, Auckland, New Zealand

Filed June 4, 1976, Ser. No. 693,079

Claims priority, application New Zealand, June 13, 1975, 177822

Int. Cl.[2] A01B *1/10*

U.S. Cl. 172—349 **6 Claims**



1. A cultivator comprising:

an arched bracket;

a handle connected to the arched bracket at the mid-point thereof and extending away therefrom;

shaft means extending between the two arms of the bracket, said shaft means comprising two shaft portions joined together at an angle at the mid-point of the shaft means;

two groups of discs, each group having a plurality of discs therein, the two groups of discs being mounted to rotate about the two shaft portions respectively, each said plurality of discs being mounted rigidly upon a spacer sleeve which maintains the discs of that group in spaced relation, the two spacer sleeves of the two groups being mounted on the two shaft portions respectively, an additional spacer sleeve being provided on the shaft means between each group of discs and the adjacent arm of the arched bracket; and

a curved spacer provided on the shaft means between the two groups of discs, the curved portion of said spacer being positioned over the angle at the mid-point of the shaft means, said spacer being curved to substantially the same degree and in the same direction as the shaft means is angled, said curved spacer acting to maintain spacing between said groups of discs, said arched bracket constituting the sole connection between the shaft means and the handle.

4,072,198

HYDRAULIC ROCK DRILL

Lester A. Amtsberg, Utica, N.Y., assignor to Chicago Pneumatic Tool Company, New York, N.Y.

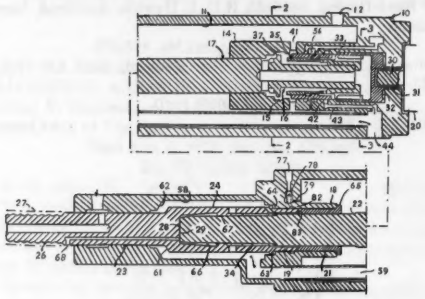
Filed Apr. 30, 1976, Ser. No. 682,093

Int. Cl.[2] B23Q *5/00*

U.S. Cl. 173—10 **18 Claims**

1. A reciprocating hydraulic impact tool including an hydraulically reciprocable piston, a cylinder for the piston, and a sleeve type cycle valve means within the cylinder and periodically engaged by the piston for effecting alternate supply to and discharge of piston operating fluid from the cylinder, wherein hydraulic coupling means is provided to translate reciprocating motion of the piston to the valve to control

acceleration of the valve in either direction in such manner that valve velocity is greater than piston velocity on a return stroke



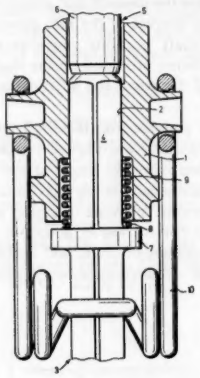
of the piston and is less than piston velocity on a power stroke of the piston.

4,072,199

MOTOR-DRIVEN PORTABLE HAMMER

Karl Wanner, Echterdingen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Feb. 7, 1973, Ser. No. 330,257
Claims priority, application Germany, Feb. 21, 1972, 2207961
Int. Cl.[2] B25D *17/04, 17/08*
U.S. Cl. 173—131 **7 Claims**



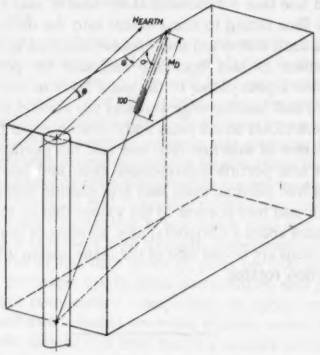
1. In a motor-driven portable impactor, a combination comprising a hammer including a housing; an elongated tool slidably journalled in said housing for lengthwise movement inwardly and outwardly of the same; biasing means biasing said tool outwardly of said housing and being dimensioned to yield when the weight of said hammer bears upon said tool longitudinally thereof; at least one slidable intermediate member interposed between said biasing means and said tool, and having one end portion bearing upon said tool, and an other remote end portion, said biasing means comprising a first spring bearing upon said other end portion; a stronger second spring also bearing upon said other end portion; and abutment means bearing upon said springs remote from said other end portion and being adjustable in direction towards and away from the same.

4,072,200

SURVEYING OF SUBTERRANEAN MAGNETIC BODIES FROM AN ADJACENT OFF-VERTICAL BOREHOLE

Fred J. Morris, Rte. 7, Box 718-E, Austin, Tex. 78703; Robert L. Waters, 11901 Springhill Drive, Austin, Tex. 78753, and George F. Roberts, McMara Road, Austin, Tex. 78758

Filed May 12, 1976, Ser. No. 685,936
Int. Cl.[2] E21B *47/02*
U.S. Cl. 175—45 **50 Claims**



1. A method of directional subsurface drilling of a first borehole to intersect a second well containing a ferromagnetic target, comprising the steps of:

measuring the components of the earth's magnetic field along orthogonal axes at a first location in the first borehole sufficiently remote from the target to be unaffected by any magnetic field of the target;

measuring components of the total magnetic field along orthogonal axes at a second location in the first borehole sufficiently proximate the target to detect the magnetic field of the target superimposed upon the earth's field;

determining the direction of the superimposed magnetic field of the target from the second location using the measurements of the components of the earth's magnetic field;

measuring the component of the total field in the direction of the axis of the first borehole at a plurality of locations in the first borehole to determine the gradient of the target field in the direction of the axis of the first borehole;

determining the range of the target from one of said plurality of locations using the measurements of the component of the total field in the direction of the axis of the first borehole; and

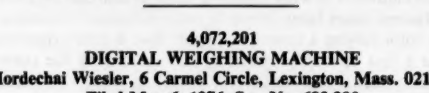
orienting the direction of drilling of the first borehole in the direction of the target magnetic field from a position in the first borehole from which the second well may be conveniently intercepted based upon the target range and direction determinations.

4,072,201

DIGITAL WEIGHING MACHINE

Mordechai Wiesler, 6 Carmel Circle, Lexington, Mass. 02173

Filed May 6, 1976, Ser. No. 683,902
Int. Cl.[2] G01G *3/00*
U.S. Cl. 177—210 R **13 Claims**



1. A weighing machine comprising:

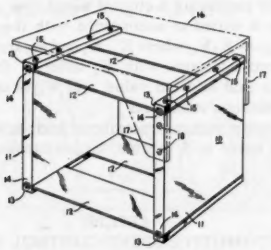
a. base means;
b. platform means constrained for movement on said base means in response to the weight of an object set thereon;
c. first mechanical means constrained for movement on said base means in response to said movement of said platform means;
d. second mechanical means constrained for movement on said base means in response to said movement of said platform means;
e. said movement of said first mechanical means stopping, after the occurrence of any oscillations, at a rest position and providing a first event that is functionally related to said weight;
f. delay means responsive to said movement of said platform means for producing a second event substantially after the termination of any of said oscillations;
g. said movement of said second mechanical means being initiated by said second event and being related to said movement of said first mechanical means;
h. electronic means for presenting indicia representing said movement of said second mechanical means;
i. said electronic means being controlled by a relationship between said first and second members.

4,072,202

ELASTIC-TYPE CLAMP FOR A TWIN LEAF SPRING SCALE

Anthony Storace, Tarrytown, N.Y., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Jan. 3, 1977, Ser. No. 756,485
Int. Cl.[2] G01G *3/08*
U.S. Cl. 177—229 **4 Claims**



1. An elastic-type clamp for sandwiching a leaf spring to a load support structure of a weighing scale, said clamp comprising two adjacently disposed channel members each having a "U"-shaped cross section with both legs of each "U"-shaped channel member disposed upon said leaf spring, each channel member being on opposite sides of said leaf spring, said channel members being fastened together with said leaf spring disposed therebetween, one leg of each "U"-shaped channel member being relatively much thinner than the other leg of said "U"-shaped channel member, whereby as the leaf spring is caused to deflect, the thinner leg of each "U"-shaped channel member will be caused to elastically deform, thus providing a controlled and predictable deflection characteristic for said leaf spring.

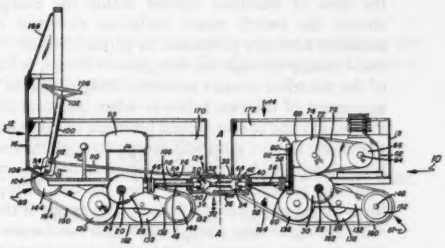
4,072,203

SMALL, PERSONAL, ALL TERRAIN VEHICLE

Neil W. Pierson, P.O. Box 98, Roseau, Minn. 56751

Filed May 14, 1976, Ser. No. 686,592
Int. Cl.[2] B62D *55/00*
U.S. Cl. 180—9.44 **13 Claims**

1. A small, personal, all terrain vehicle of the articulated, multi-unit type primarily for transporting a single person, comprising, in combination: a first unit including a first axle having a first end and a second end, and a second unit including a second axle having a first end and a second end; a first track member pivotally mounted to the first end of the first axle; a second track member pivotably mounted to the second end of the first axle; a third track member pivotably mounted to the first end of the second axle; a fourth track member pivotably mounted to the second end of the second axle; first means for connecting the second unit to the first unit, for allowing the second unit to rotate about a longitudinal axis parallel to the intended movement direction with respect to the first unit, and for allowing the second unit to pivot about an axis perpendicular to the longitudinal axis with respect to the first unit; means for receiving and allowing the seating of a driver within the first unit; means, located in the first unit, for steering the all terrain vehicle by pivoting the second unit with respect to the first unit about the axis perpendicular to the longitudinal axis of



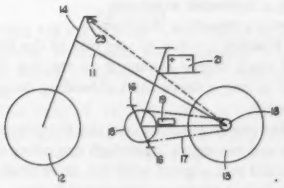
the first means; a motor located in the second unit; power train means for providing movement of the first, second, third, and fourth track members from the power received from the motor, wherein the all terrain vehicle provides advantageous weight distribution in that the weight of the driver of the all terrain vehicle is located in the first unit to provide substantial traction to the first and second track members and the weight of the motor of the all terrain vehicle is located in the second unit to provide substantial traction to the third and fourth track members, and wherein the first means and the pivotable interconnection of the first, second, third, and fourth track members to the first and second axles assure that all four track members engage the travel surface, even if the travel surface is a very rough terrain.

4,072,204

CYCLE GEAR SELECTOR

Peter Watson Leighton, Burnly, and Charles Patrick Duncan Davidson, Droitwich, both of England, assignors to Lucas Industries Limited, Birmingham, England

Filed Jan. 21, 1976, Ser. No. 650,872
Claims priority, application United Kingdom, Jan. 21, 1975, 2630/75
Int. Cl.[2] B62M *7/00, 25/04*
U.S. Cl. 180—34 **4 Claims**



1. In combination with a gear selector for a cycle assisted by an electric motor and a gear mechanism wherein rotation of the input member of said gear mechanism is caused to cease during a change of gears caused by manual operation of the gear selector, the gear selector including a body member secured to the frame of the cycle, a manually operable lever

pivotally mounted to the body member and mechanically connected to the gear mechanism whereby movement of the lever relative to the body member causes a change in gear ratio between input and output members of said gear mechanism, a cam movable with the lever relative to the body member, a cam follower engaging the cam and being movable with movement of the lever to first positions whereby gears in the gear mechanism are caused to be engaged in varying gear ratios, the cam follower further being movable with movement of the lever to second positions whereby the gears in the gear mechanism are disengaged from effective mechanical contact with ground-engaging rotary portions of the cycle, an electrical energization circuit including the motor and a source of electrical energy, the improvement comprising:

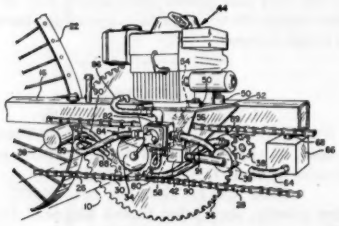
switch means carried by the body member for controlling the flow of electrical current within the energization circuit, the switch means including electrical contact members normally positioned to permit the flow of electrical energy through the energization circuit, at least one of the electrical contact members being displaced by the movement of the cam follower when said cam follower moves into one of said second positions to cause interruption of the flow of electrical energy through the energization circuit, said displaced electrical contact member returning to normal position when the cam follower returns to one of said first positions, movement of the lever effecting a gear ratio change in the gear mechanism and at the same time sequentially interrupting and then re-establishing the flow of electrical energy to the energization circuit.

4,072,205

IRRIGATION SYSTEM

Paul E. Batson, Springfield, Oreg., assignor to Crown American Irrigation, Inc., Eugene, Oreg.

Filed Oct. 18, 1976, Ser. No. 733,179
Int. Cl.² B60K *17/10*
U.S. Cl. 180—66 R **6 Claims**



1. In an irrigation line move,

a cart frame including a tubular beam closed at its ends and forming a hydraulic reservoir,

wheel means supporting the frame,

a tubular bracket secured to one side of the frame,

a vertical shaft engine mounted on the top of the tubular bracket having a drive shaft extending downwardly into the bracket,

a hydraulic pump mounted on the bottom of the tubular bracket and having an input shaft extending upwardly into the bracket and aligned with the drive shaft,

flexible coupling means coupling the shafts,

hydraulic motor means,

torque tube means,

gear means coupling the motor means and the torque tube means,

manually operable valve means for connecting the pump to the motor means,

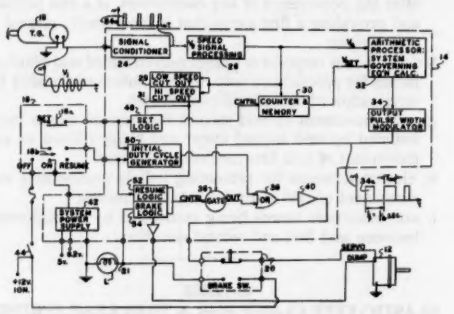
and hose means connecting the beam to the valve means.

4,072,206

DEVICE FOR REGULATING VEHICLE ROAD SPEED

Gerald L. Larson, Battle Creek, Mich.; Alberto Pi, New Orleans, La., and Martin W. Uitvlugt, Battle Creek, Mich., assignors to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 469,568, May 13, 1974, abandoned. This application Mar. 29, 1976, Ser. No. 671,539
Int. Cl.² B60K *31/00*
U.S. Cl. 180—105 E **10 Claims**



1. A device for maintaining a selected speed in a throttle controlled motor vehicle, said device comprising:

means for sensing the substantially instantaneous value of the actual vehicle speeds;

means for registering a selected value of said sensed vehicle speed to represent said selected speed;

means for producing a control signal, one characteristic of which is varied in accordance with the value of $K_1 + K_2V_{SET} + K_3V_G$ where K_1, K_2 and K_3 are predetermined, non-zero constants with K_2 different from K_3, where V_{SET} is said selected value, and V_G is said substantially instantanecus value; and

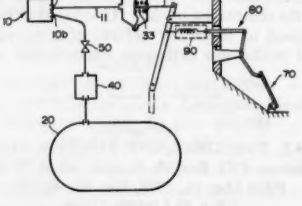
servoactuator means responsive to said varying characteristic to move said throttle for maintaining said selected speed.

4,072,207

AUTOMOTIVE SPEED CONTROL DEVICE

Toshihiro Kokubo, Higashi Matsuyama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 637,667, Dec. 4, 1975, abandoned. This application Dec. 27, 1976, Ser. No. 754,452
Claims priority, application Japan, Dec. 7, 1974, 49-148994; Dec. 7, 1974, 49-148995; Dec. 7, 1974, 49-148996
Int. Cl.² B60K *31/00*
U.S. Cl. 180—108 **9 Claims**



1. A speed control device for an automotive vehicle having an accelerator member selectively movable by a vehicle operator between an accelerating position and a decelerating position, comprising in combination:

speed responsive means having a fluid pressure converter responsive to a vehicle speed to produce an operating

fluid pressure when the vehicle speed exceeds a predetermined level;

pressure responsive means operatively connected between the speed responsive means and the accelerator member and responsive to the operating fluid pressure to apply a force of the operating fluid pressure to the acceleration member to hold the same at the decelerating position providing a speed lower than the predetermined level;

relief means operatively connected to the accelerator member to relieve a force applied to the accelerator member by the vehicle operator against the force of the operation fluid pressure applied to the same;

release signal producing means cooperated with an alarm provided in the vehicle to produce a release signal when the alarm is actuated; and,

pressure release means provided between the speed responsive means and the pressure responsive means and responsive to the release signal to release the operating fluid pressure whereby the accelerator member is movable to the accelerating position.

4,072,208

METHOD AND APPARATUS FOR SEISMIC PROSPECTING

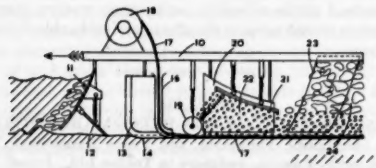
Rupert Richard Francis Gerard Heron Goodhart, Birmingham, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 208,765, Dec. 16, 1971, abandoned. This application Jan. 22, 1975, Ser. No. 543,221

Claims priority, application United Kingdom, Dec. 29, 1970, 61602/70

Int. Cl.² G01V *1/02, 1/10;* 102 *23*

U.S. Cl. 181—401 **15 Claims**



1. A method of seismic prospecting comprising clearing snow from a strip of hard surface layer which is covered with snow so as to expose said hard layer, laying a line of explosive cord along and in contact with a longitudinal portion of the cleared hard surface, moving snow from along side the cleared strip and covering the line of explosive cord with a layer of said snow, compressing the said snow layer to form a stemming layer around the cord, detonating the explosive and recording the resulting seismic waves after reflection or refraction from subterranean rock layer interfaces.

4,072,209

MECHANIC'S STAND

Gary W. Bolis, Box 81, Creamery, Pa. 19430

Filed Oct. 6, 1976, Ser. No. 730,093

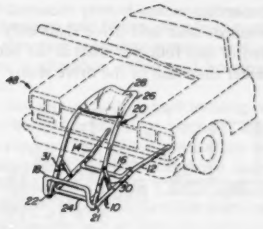
Int. Cl.² E04G *1/24*

U.S. Cl. 182—116 **9 Claims**

1. A mechanic's stand, for supporting the body of one working over the engine compartment of motor vehicle or the like, comprising:

a base having substantially horizontal, but flexibly arched legs;

an extended, flexibly arched frame connected to said base and inclined to extend above the engine compartment when said stand is directionally positioned in close proximity to the motor vehicle; 'a step mounted on said stand adjacent to said connection between said base and said extended frame, said step extending upwardly from said base and spaced away from said extended frame; and,



means mounted on said extended frame for supporting the torso of said worker in an inclined working position above the engine compartment.

4,072,210

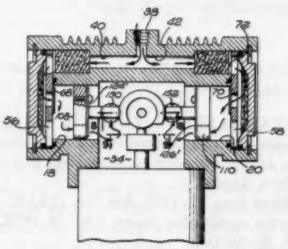
COMPRESSOR

Chao C. Chien, 1371 Whitehall Place, Westlake Village, Calif. 91361

Filed Jan. 19, 1976, Ser. No. 650,478

Int. Cl.² F16N *1/00*

U.S. Cl. 184—5 **4 Claims**



1. In a Scotch-yoke type of mechanism, having a reciprocating yoke, a slider in said yoke and a bearing hole for a crankpin, the improvement wherein said slider is constructed of lubricant-impregnated porous solid, bearing material and is formed with a cross hole normal to and across said bearing hole, one end of said bearing hole terminating past said cross hole and through said slider, and wherein lubricant-containing wick material is disposed in said cross hole with a portion of said wick material disposed at said bearing hole end for additional lubrication of said slider and yoke thereat.

4,072,211

DRIVING DEVICE FOR A MOVING BODY

Tadayuki Kitajima, Yokohama, and Yoshikuni Tohyama, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed June 17, 1976, Ser. No. 697,127

Claims priority, application Japan, July 1, 1977, 50-81194

Int. Cl.² F03G *1/00*

U.S. Cl. 185—40 R **4 Claims**

1. A driving device for a moving body comprising:

a drive shaft normally rotated in one direction by a drive source;

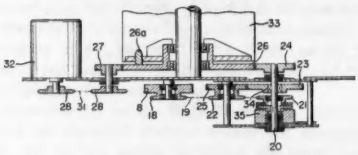
a follower shaft in engagement with said drive shaft to transmit a driving force to the moving body;

first connecting means loosely mounted on said drive shaft to connect and disconnect the driving force of said drive shaft to said follower shaft;

accumulator means for accumulating a backwardly moving

force for said moving body by utilizing the movement of the moving body resulting from the rotation of said follower shaft in a forward direction; and

one-way connecting means loosely mounted on said drive shaft to connect with said drive shaft only when a rotational speed of said follower shaft in the backward direction is greater than that of the drive shaft;



said follower shaft being driven into reverse rotation by said accumulator means upon disconnection of said first connecting means and the speed of the reverse rotation of said follower shaft being controlled by operation of said one-way connecting means so as not to exceed the driving speed of said drive shaft, thereby maintaining a constant rotational speed thereof.

4,072,212

ELEVATOR SPEED CONTROL SYSTEM

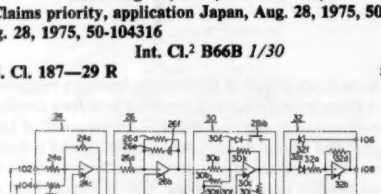
Narihiro Terazono; Hiroshi Kamaike, and Shigehiko Suzuki, all of Inazawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 17, 1976, Ser. No. 715,197

Claims priority, application Japan, Aug. 28, 1975, 50-104315; Aug. 28, 1975, 50-104316

Int. Cl.² B66B *1/30*

U.S. Cl. 187—29 R **5 Claims**



1. An elevator speed control system comprising, in combination, an elevator car and a counterweight connected to both ends of a traction rope respectively, a hoist sheave having said traction rope trained thereover, an induction motor for driving said hoist sheave to vertically move said elevator car and said counterweight in the opposite directions, and means for applying to said induction motor a voltage dependent upon a differential signal between a command speed signal for the motor and a speed signal representative of the actual speed of the motor, to accelerate the latter and applying a rated voltage across said motor after the completion of the acceleration of the motor, wherein there is provided a sensor circuit for sensing a negative polarity load on said induction motor to limit a voltage applied across said induction motor through the operation the sensor circuit.

4,072,213

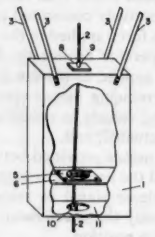
SUSPENDED CABLE APPARATUS

John Kennedy Salmon, Mendham, N.J., assignor to Otis Elevator Company, New York, N.Y.

Filed Aug. 9, 1976, Ser. No. 713,083

Int. Cl.² F16F *7/10*

U.S. Cl. 188—1 B **12 Claims**



1. A suspended cable apparatus for damping vibration of a cable suspended from a structure comprising:

mounting means attached to said structure and extending a given distance from said structure along the length of said cable; and

a mechanism mounted on said mounting means and including cable deflecting means engaging said cable, said cable deflecting means when located in a predetermined position deflecting said cable from the longitudinal path in which it would be suspended in the absence of said cable deflecting means, said cable deflecting means being movable in response to cable vibration and controlling the portion of said cable at its location of engagement with said cable deflecting means to move in response to predetermined cable vibration with more motion than said portion would move in the absence of said cable deflecting means.

4,072,214

DISC BRAKE WITH NON-DEFORMABLE YOKE

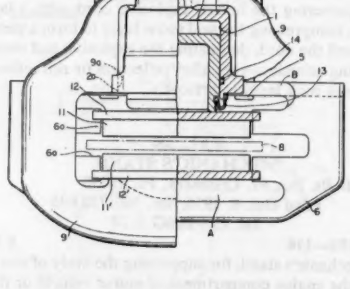
Tetsuo Haraikawa, Funabashi, and Yasuo Karasudani, Yokohama, both of Japan, assignors to Tokico Ltd., Japan

Filed Oct. 21, 1976, Ser. No. 734,513

Claims priority, application Japan, Oct. 23, 1975, 50-127763

Int. Cl.² F16D *55/18*

U.S. Cl. 188—72.4 **7 Claims**



1. A disc brake comprising a bracket for mounting on a non-rotatable part of a vehicle and straddling a rotatable disc, a pair of spaced opposed friction pads slidably mounted on said bracket for movement toward and away from opposite sides of said disc, a housing disposed on one side of the disc, pin means between said bracket and said housing for slidably supporting the housing for movement in a direction parallel to the axis of the disc, said housing having a cylinder therein, a piston in said

cylinder engaging one of the friction pads for urging the one friction pad against one surface of the disc and a plate-like yoke straddling the disc and connecting the other friction pad disposed on the opposite side of the disc with the housing, the yoke engaging the housing with an interference fit at least along portions of the yoke extending between the other friction pad and the end of the housing remote from said friction pads.

4,072,215
SPOT TYPE DISC BRAKE FOR A PAIR OF INDEPENDENT YOKE BIASING SPRING ELEMENTS

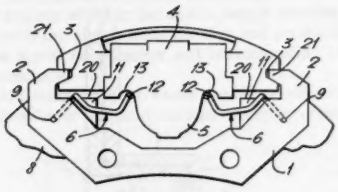
Jochen Burgdorf, Offenbach; Dieter Eikenberg, Frankfurt-Rodelheim; Roberto Stoka, Sulzbach, and Vlod Marianu, Frankfurt-Griesheim, all of Germany, assignors to ITT Industries, Incorporated, New York, N.Y.

Continuation of Ser. No. 655,921, Feb. 6, 1976, abandoned. This application Jan. 7, 1977, Ser. No. 757,525

Claims priority, application Germany, Aug. 29, 1977, 2505879

Int. Cl.[2] F16D *55/18*

U.S. Cl. 188—72.4 **2 Claims**



1. A spot type disc brake for automotive vehicles including a non-rotating brake carrier to receive brake torque, said brake carrier being fixed in relation to a brake disc, a yoke member positioned to protrude over and embrace said brake disc and slidably guided by said brake carrier in the direction of the brake disc axis including an actuating device arranged on one side of said brake disc, a pair of biasing resilient spring elements, each of said biasing spring elements having a fastening end rotatably carried in a retaining aperture formed in said brake carrier on said one side of said disc, each of said biasing spring elements being positioned wholly on said one side of said disc, said fastening end of each of said spring elements having an insertion portion for positioning in said retaining aperature which extends substantially parallel to the axis of said disc which is of sufficient length to engage said retaining aperture and extends towards said disc, then is bent so as to extend towards said axis, then is bent so as to extend away from said disc forming a U-shaped middle section adapted to embrace a portion of said brake carrier and has a free end portion projecting away from said brake disc arranged to resiliently contact and bias said actuating device for holding said yoke in relation to said carrier without clearance.

4,072,216
DISC BRAKE GUIDING AND SUPPORT STRUCTURE

Tetsuo Haraikawa, Funabashi, Japan, assignor to Tokico Ltd., Kawasaki, Japan

Filed Aug. 10, 1976, Ser. No. 713,037

Claims priority, application Japan, Aug. 14, 1975, 50-98822; Aug. 14, 1975, 50-98824; Aug. 14, 1975, 50-98825; Aug. 14, 1975, 50-112188[U]; Aug. 14, 1975, 50-112189[U]

Int. Cl.[2] F16D *55/224*

U.S. Cl. 188—73.3 **9 Claims**

1. In a floating caliper type disc brake including

a pair of brake pads for respectively engaging corresponding zones on opposite sides of a disc to be braked, said pads being subject to wear and typically requiring replacement during the normal life of the remainder of the brake;

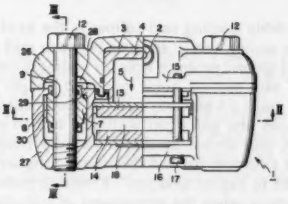
a fixed, bifurcated support disposed adjacent one side of said disc and having a pair of spaced arms extending outwardly beyond the circumference of said disc and providing clearance to one of said zones for one of said pads, said arms being respectively provided with guide holes having parallel axes disposed outwardly of the circumference of said disc;

a housing having a pair of spaced caliper portions and intermediate structure extending between said caliper portions presenting a chamber within said housing for receiving said pads;

means for shiftably mounting said housing on said support with said caliper portions on opposite sides of said disc and said support, said housing mounting means including a pair of spaced, parallel slide bolts each extending in sliding relationship through a correponding of said holes and in tension between said caliper portions;

means for mounting each of said pads upon a corresponding caliper portion within said chamber and in facing relationship to each other and a corresponding of said zones; and

means for shifting said one pad relative to the caliper portion upon which it is mounted and into forceful engagement with said one zone of said disc and for thereby shifting



said housing relative to said support and shifting the other of said pads into opposing forceful engagement with the other of said zones of said disc;

the improvement of which brake comprises:

said intermediate structure of said housing includes a pair of wall portions extending between said caliper portions adjacent each of said bolts respectively, one of said wall portions of each pair thereof being displaced from its bolt in a direction generally away from the other bolt, the other of said wall portions of each pair thereof being displaced from its bolt in a direction generally toward the other bolt, whereby said wall portions prevent distortion of said housing and shifting of the axes of said bolts under the influence of normal tension in said bolts; and

said other wall portions are spaced from each other a distance sufficiently greater than the corresponding dimension of said pads to permit the latter to pass therebetween, whereby an opening is provided from the outer part of said housing to said chamber therewithin for convenient movement of said pads into and out of said chamber during replacement of said pads without disassembly of said housing.

4,072,217
DISCS BRAKE OF FLOATING CALIPER TYPE

Takehisa Inoue, Iwatsuki; Yutaka Ogawa, Tokyo; Hiroaki Sugita, Gyoda, and Namio Watanabe, Kuki, all of Japan, assignors to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Filed Nov. 1, 1976, Ser. No. 737,346

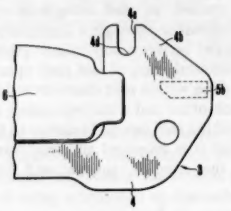
Claims priority, application Japan, Oct. 31, 1975, 50-148669[U]; Oct. 31, 1975, 50-148670[U]

Int. Cl.[2] F16D *65/02*

U.S. Cl. 188—73.6 **8 Claims**

1. A disc brake of the floating caliper type for a vehicle wheel, comprising a rotor arranged to rotate together with the wheel, a pair of friction pads each positioned on an opposite side of said rotor, a support structure having a hole therein and supporting said pair of friction pads, said support structure having a slotted portion opening from and extending laterally from the hole formed therein, said support structure arranged

to be fixably connected to a vehicle body, a caliper having acting and reacting portions arranged on opposite sides of said rotor for bringing said pair of friction pads into engagement with said disc, said caliper including first and second laterally spaced receptor holes formed therein, a first guide pin secured to said support structure and slidably received in said first receptor hole of said caliper, a single second guide pin, a nut threaded on said second guide pin and rigidly securing one end of said pin within said laterally slotted hole in said support structure and the other end of said pin engaged in the second receptor hole formed in said caliper, said first and second guide



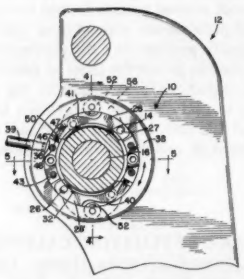
pins slidably guiding said caliper in the axial direction of said rotor, a sealing means secured between said second guide pin and said second receptor hole for sealingly enclosing said other end of said second guide pin, said caliper along with said second guide pin and said sealing means being pivotally rotated about said first guide pin with said second guide pin moving through said slotted portion outwardly from the hole in said support structure toward the lateral periphery of said support structure to expose said pair of friction pads for removal and replacement when the securement of said second guide pin to said support structure is released by loosening said nut.

4,072,218

SPINDLE BRAKE MECHANISM FOR MILLING MACHINES

Thomas F. Specht, Arlington Heights; Juergen W. Trodler, Chicago, and Pavel Vanecek, Lyons, all of Ill., assignors to Union Special Corporation, Chicago, Ill.

Filed Dec. 8, 1976, Ser. No. 748,424
Int. Cl.[2] F16D *49/00*
U.S. Cl. 188—75 **4 Claims**



1. A brake mechanism for a milling machine having a rotating spindle means, a tool carried on said spindle means, and means for cooling said tool, said brake mechanism comprising:

a shiftable ring means;

a base plate means secured to said machine on one side of said shiftable ring means;

a top plate means including means for securing said top plate means to said base plate means on the other side of said shiftable ring means whereby forming a chamber means;

sealing means carried by said top plate means for association with said rotating spindle means for maintaining said coolant means out of said chamber means;

at least one brake shoe means disposed within said chamber means and being adapted to radially move into and out of contact with said rotating spindle means, said brake shoe means including a camming surface means thereon;

roller means carried by said shiftable ring means for association with said camming surface means; and

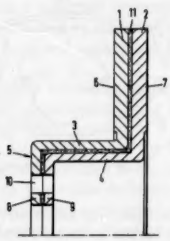
operator controlled means operatively connected to said ring means for moving said roller means into engagement with said camming surface means whereby forcibly moving said brake shoe means into contact with said rotating spindle means.

4,072,219

MULTI-PART DISC BRAKE

Heinz Guenter Hahm, Frankfurt, and Klaus Neef, Seligenstadt, both of Germany, assignors to ITT Industries, Incorporated, New York, N.Y.

Continuation of Ser. No. 636,345, Nov. 28, 1975, abandoned.
This application Jan. 27, 1977, Ser. No. 762,912
Claims priority, application Germany, Dec. 7, 1974, 2458034
Int. Cl.[2] F16D *65/12*
U.S. Cl. 188—218 XL **10 Claims**



1. A multi-part brake disc for disc brakes for attachment to a brake carrier on an automotive vehicle comprising:

at least two juxtaposed brake rings carried by a cup-shaped hub having a bottom, said brake rings being connected with one another at said hub, said cup-shaped hub having side walls extending outwardly from said bottom in one direction and said brake rings extending outwardly from said bottom in a direction opposite from said one direction;

said cup-shaped hub comprising at least two hub members of substantially the same cup-like shape fitted into one another;

each of said hub members having an integrally formed brake ring thereon; and

peripherally spaced openings through said side walls of said hub members for fastening means for interconnecting said hub members and said brake rings and for securing the assembled brake disc to said carrier.

4,072,220

APPARATUS FOR CONTROLLING ACTUATING FLUID PRESSURE ON VEHICULAR FRICTION CLUTCH WITH COMPENSATION FOR DECREASE IN FRICTION COEFFICIENT AT ELEVATED TEMPERATURE

Hideo Hamada, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed June 23, 1976, Ser. No. 699,174
Claims priority, application Japan, June 25, 1975, 50-79583
Int. Cl.[2] B60K *21/00*
U.S. Cl. 192—.075 **5 Claims**

1. In a motor vehicle having an engine and a fuel supply line for supplying fuel thereto, a throttle valve in the fuel supply line for the vehicular engine, a driving shaft driven from the engine, a clutch of the friction type including a clutch input member mounted on said driving shaft and a clutch output member with friction faces, a driven shaft connected to the

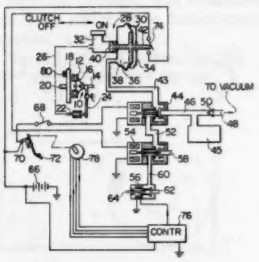
clutch output member and a clutch actuating mechanism including a hydraulic cylinder to apply an actuating force to the clutch, a vacuum chamber to selectively communicate with a vacuum source and the atmosphere such that the displacement of a piston of the hydraulic cylinder is governed by the magnitude of vacuum in the vacuum chamber, a control apparatus for automatically controlling the rate of variation in said magnitude of vacuum and modulating the variation rate when the clutch has a high temperature to compensate for a decrease in the coefficient of friction of the clutch output member, the control apparatus comprising:

a combination of a plurality of electromagnetic valves arranged to provide fluid communication of said vacuum chamber with the atmosphere selectively through a plurality of orifices respectively having different cross sectional areas; means defining said orifices;

means for sensing the degree of opening of the throttle valve and producing at least one electrical signal indicating and representing in which of a plurality of ranges is the degree of opening, said ranges being defined by dividing the difference of the maximum opening from the minimum opening into a plurality of successive ranges;

means for sensing whether the clutch output member is in contact with the clutch input member and producing an electrical signal representing and corresponding to the sensed condition;

an electrical control circuit to excite one of said electromagnetic valves such that said vacuum chamber communi-



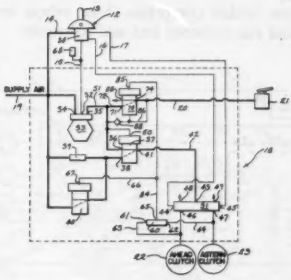
cates with a first one of said orifices for a predetermined period of time when the clutch output member is brought into contact with the clutch input member and the degree of opening of the throttle valve is in the smallest range, said vacuum chamber communicating with a second one of said orifices when said one electromagnetic valve is unexcited, a difference in cross-sectional area between said first and second orifices being such that said magnitude of said vacuum varies at different rates to cause the clutch actuating force to increase at a higher rate when said vacuum chamber communicates with said first orifice;

a temperature sensor for sensing whether the temperature of the clutch output member is above a predetermined temperature and producing an electrical signal representing and corresponding to the sensed temperature range, the temperature sensor having a reed relay, a stationary member located close to the clutch input member to which said reed relay is attached, a permanent magnet attached to the clutch input member and heat-sensitive means for varying magnetic flux density through said reed relay such that said reed relay is closed at least once per revolution of the clutch input member when the temperature of the clutch output member exceeds said predetermined temperature, means connecting said temperature sensor to said control circuit to supply an electrical signal representing the state of said reed relay, said control circuit having an r-c circuit to prolong said predetermined period of time by a predetermined length after said reed relay is closed.

4,072,221
MARINE CLUTCH AND THROTTLE GOVERNOR CONTROL SYSTEM

John M. Phinney, Milwaukee, Wis., assignor to The Falk Corporation, Milwaukee, Wis.

Filed Aug. 19, 1976, Ser. No. 715,680
Int. Cl.[2] B60K *29/02*
U.S. Cl. 192—.098 12 Claims



1. A pneumatic clutch control system for a marine propulsion drive including a prime mover controlled by a throttle speed governor, a drive train for transmitting power from the prime mover to a propeller drive shaft, an air inflatable clutch for connecting the prime mover to said drive train, and throttle means for actuation of the propulsion system, said control system being adapted for connection to a source of pressurized air and comprising:

first and second air branches each leading from said air source to a main control valve which is shiftable to connect one or the other of said air branches to said clutch,

said first air branch including means operatively connected to said throttle means to provide an air output that is responsive to air pressure supplied to said first branch by said throttle means;

said main control valve being responsive to the air output from said first branch to disconnect said first branch and connect said second branch to said clutch when said air output reaches a first control pressure;

said second air branch continuing the inflation of said clutch without further control of said throttle means; and

a throttle governor control means connected to receive the air output of said first air branch and for providing a speed pressure signal to said throttle speed governor which is proportional to said air output, said governor control means comprising a normally closed governor valve responsive to the air pressure in said clutch and adapted to be actuated to connect said first air branch to said governor when the clutch pressure rises to a first piloting pressure, said governor valve being further responsive to said speed pressure signal to have said speed pressure signal oppose the clutch pressure so that said governor valve will close when clutch pressure is less than the combination of said speed pressure signal and said first piloting pressure.

4,072,222
SINGLE STROKE CONTROL SYSTEM

George M. Coon, Hillside House, Saybrook Road, Essex, Conn. 06426

Filed Dec. 22, 1976, Ser. No. 753,596
Int. Cl.[2] B30B *15/14*; F16D *67/04, 71/00*
U.S. Cl. 192—131 R 20 Claims

1. In a single cycle control system for a machine in which fluid pressure controls the starting and stopping of the machine and having a downstroke followed by a return upstroke, said system having:

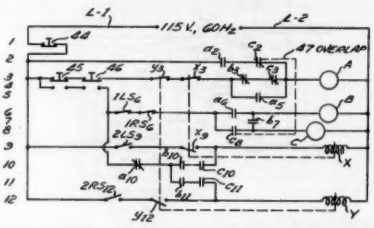
first and second normally-closed valves connected to con-

trol said fluid pressure such that the machine is stopped if either valve is closed;

first and second solenoids for controlling said valves individually such that each solenoid must be energized to open the corresponding valve;

and a pair of run switches, each having normally-closed contacts which are closed when the switch is released and normally-open contacts which are closed when the switch is operated;

the improvement which comprises three relays operatively connected to said run switches and said solenoids



(1) to energize both solenoids in response to the operation of both run switches, whereby to start the downstroke of the machine,

(2) to de-energize at least one of said solenoids in response to the release of either run switch during substantially the entire downstroke of the machine, whereby to stop the downstroke, and

(3) to maintain said last-mentioned solenoid de-energized until both run switches are released and thereafter both run switches are operated again.

4,072,223

CONTROL SYSTEM OF COIN-OPERATED LOCKER

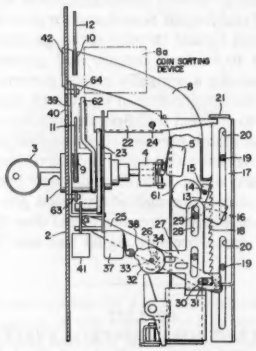
Yoshio Kinoshita, and Masayuki Iguchi, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Japan

Filed Oct. 26, 1976, Ser. No. 735,410

Claims priority, application Japan, Oct. 24, 1975, 50-128677; Dec. 18, 1975, 50-151362

Int. Cl.[2] G07F *17/10*

U.S. Cl. 194—54 **5 Claims**



1. A control system of a coin-operated locker which comprises:

a time-lapse detecting section for producing a time-lapse output signal whenever a predetermined unitary period of time has passed starting from the time instant when said locker is used;

b. a control section for producing a control signal by receiving, as input condition signals, the time lapse output signal from said time-lapse detecting section, and a signal generated by operating a key of a lock provided on said locker;

c. a stepping drive mechanism which under the control of said control section is driven by stepping drive means to advance stepwise in one direction when said lock is unlocked and when an overtime fee charging operation is effected, and to advance stepwise in the opposite direction when a coin is inserted into said locker; and

d. means for stopping, when said stepping drive mechanism is advanced stepwise in the one direction during said overtime fee charging operation, the operation of an opposite direction stepping drive section relating to the drive of said stepping drive mechanism in the opposite direction, so as to continue the drive of said stepping drive mechanism in the one direction.

4,072,224

PRINTING DEVICES

Bernard Sydney Barnaby, Ware; Cyril Walter Coe, Wembley; Godfrey Stephen Hall, and John Harwood Leworthy, both of Newton Aycliffe, all of England, assignors to The General Electric Company Limited, London, England

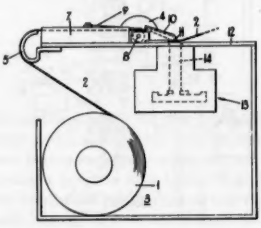
Continuation-in-part of Ser. No. 362,754, May 22, 1973, abandoned, and Ser. No. 497,530, Aug. 15, 1974, abandoned.

This application Oct. 14, 1975, Ser. No. 621,833

Claims priority, application United Kingdom, May 24, 1972, 24431/72; Australia, May 23, 1973, 56056/73; Italy, May 23, 1973, 68511/73; United Kingdom, Aug. 17, 1973, 38970/73

Int. Cl.[2] B41J *3/04*

U.S. Cl. 197—1 R **2 Claims**



1. A printer for a tape which constitutes an elongated web, said printer comprising:

A. tape transport means to advance the tape through a printing station at which the tape is movable in a plane in a direction parallel to the longitudinal axes of the tape,

B. a single stationary anvil which has a narrow rectilinear edge and which is mounted at the printing station so that said edge lies adjacent and parallel to and to one side of said plane, the length of said edge of said anvil extending in a direction transverse to the direction of tape advancement; and

C. a printer unit which is mounted at the printing station to lie on the opposite side of said plane to the anvil, said printer unit including:

i. a plurality of elongated narrow planar metal strips each having an end portion that constitutes a printing element;

ii. means to mount said strips to lie side-by-side in face-to-face contact in a stack, the dimension of which perpendicular to the planes of the strips extends in a direction parallel to the length of said rectilinear edge of said anvil for limited longitudinal sliding movement relative to one another and with said end portions thereof lying generally parallel to the direction of tape advancement and facing the rectilinear edge of said anvil,

iii. a plurality of electromagnets forming a first group of electromagnets,

iv. a plurality of further electromagnets forming a second group of electromagnets,

v. means to mount said first and second groups of electromagnets so that the two groups are disposed on opposite sides of said stack of strips with the longitudinal axes of the electromagnets of both groups lying parallel to the lengths of said elongated strips, and

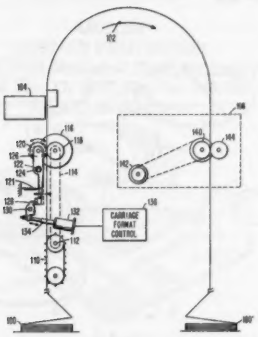
vi. a plurality of armatures each having a projecting finger portion and each associated with a different one of said electromagnets of the first and second groups and with one of said strips, each armature lying with its finger portion adjacent the end of the associated strip remote from said end portion thereof so that upon energization of any one of the electromagnets during use of the printer unit, the attraction of the associated armature causes the finger portion of that armature to press against the end of the associated strip remote from said end portion and effect longitudinal movement of the associated strip towards said anvil to print a mark by cooperation of said end portion of that strip and said anvil and a character is printed by selective energization of said electromagnets of the first and second groups as the tape is advanced to cause a plurality of such marks to be printed each by cooperation of the end portion of the appropriate strip and said anvil;

vii. all of said strips cooperating during advance of said tape to form a single character.

4,072,225
COMBINED PIN FEED AND PRESSURE ROLL FORMS ADVANCEMENT APPARATUS

Donald Franklin Manning, Endicott, and Robert Allan Ryan, Endwell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 23, 1976, Ser. No. 744,356
Int. Cl.² B41J *15/00*
U.S. Cl. 197—133 R **7 Claims**



1. In a high speed printer, including a print station, apparatus for advancing marginally punched continuous forms comprising in combination:

sprocket drive means for continuously engaging marginal perforations in the continuous forms and advancing sheets thereof to be printed;

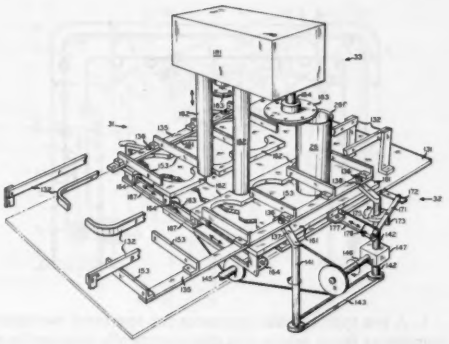
pressure roll drive means, located along the direction of continuous forms advancement and intermediate said sprocket drive means and the print station, selectively actuable in response to format control signals, for incrementally advancing each sheet past the print station and independently of said sprocket drive means; and

an incremental motion device for driving in synchronism said sprocket drive means and said pressure roll drive means; whereby each sheet is advanced continuously by said sprocket drive means whenever said pressure roll drive means is not actuated, and past said print station line by line during a printing operation whenever said pressure roll drive means is actuated.

4,072,226
CONVEYOR APPARATUS FOR USE WITH A CONTAINER MANUFACTURING APPARATUS

Frank P. Richards, Prairie Village, Kans., and Raymond C. Taylor, Grandview, Mo., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 10, 1975, Ser. No. 630,555
Int. Cl.² B65G *25/04*
U.S. Cl. 198—345 **15 Claims**



1. Conveyor means for incrementally advancing individual articles in a generally straight line movement to successive conveyor stations, comprising:

support means;

a longitudinal member carried by said support means and oriented generally parallel to the direction of said generally straight line movement and pivotally mounted at a plurality of points, at least two of which are drive points, along its length;

means operably associated with said longitudinal member for moving each said drive point through a circuitous locus, each such locus being in a plane which is generally parallel to said generally parallel straight line movement, and such loci being of substantially equal shape;

a plurality of transverse members, each rigidly affixed to said longitudinal member, spaced at substantially equal distances along said longitudinal member;

a stationary surface underlying said transverse members for accommodating the sliding movement of articles thereon; and

gripping means movably mounted on said support means and positioned adjacent said longitudinal member, said gripping means being operable for selectively engaging an article at one or more stations and preventing advancing movement and rotational movement of the article when said gripping means is in engagement therewith, said gripping means including two generally parallel gripping members, each said gripping member mating with the other to define jaw means for gripping an article with the thus gripped article being located at a respective one of said stations of said conveyor means, said jaw means being sized and shaped to engage a substantial portion of the periphery of the article therein;

means for moving both said gripping members toward each other to grip the bottom of an article and for moving both said gripping members away from each other to release an article.

4,072,227
PIN TYPE TRANSFER APPARATUS FOR APERTURED-WORKPIECES

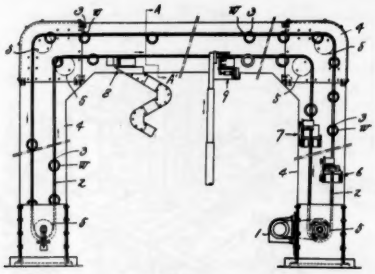
Motoi Nomura, Takarazuka; Yasuhiro Shirai, Shizuoka; Yoshiaki Yoshinaga, Iwata, and Kouji Yamaizumi, Fukuroi, all of Japan, assignors to NTN Toyo Bearing Co. Ltd., Japan

Filed Jan. 28, 1976, Ser. No. 653,153

Claims priority, application Japan, Jan. 28, 1975, 50-12096; Nov. 13, 1975, 50-137049; Nov. 14, 1975, 137605; Nov. 15, 1975, 50-137414; Nov. 18, 1975, 50-139103; Nov. 26, 1975, 50-142117

Int. Cl.[2] B65G *43/00*

U.S. Cl. 198—370 3 Claims



1. A pin type transfer apparatus for apertured workpieces comprising frame means, slot means vertically disposed in said frame means, endless chain means operatively positioned for movement around said frame means in a vertical plane and in vertical alignment with said slot means of said frame means, a plurality of pin means attached at one end to one lateral surface of said chain means at spaced points therealong, and projecting outwardly therefrom and extending through the slot means of said frame means for vertical movement therein, horizontally disposed hand-over dish means operatively associated with said frame means, said dish means having horizontally disposed slot means positioned centrally thereon from one edge thereof and in registry with the vertically disposed slot means of said frame means to permit the pin means to move therethrough, said hand-over dish means including means for moving said dish means back and forth, means to push a workpiece laterally from a loading position onto said hand-over dish means and in registry with the horizontally disposed slot positioned therein, adjusting means positioned rearwardly of said hand-over dish means for positioning a workpiece thereon in a normal position and insertion means mounted on said frame means and positioned above said hand-over dish means, said frame means straddling said chain means and said pin means thereby permitting a workpiece positioned on the hand-over dish means to be firmly caught by the transfer pin means and thereafter transferred upwardly to a predetermined place.

4,072,228
APPARATUS FOR EVENING AN IMBRICATED STREAM OF PRINTED PRODUCTS

Werner Honegger, Ruti, and Erwin Müller, Durnten, both of Switzerland, assignors to Ferag AG, Hinwil, Switzerland

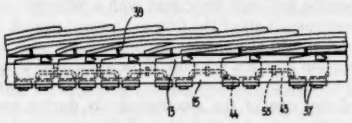
Filed May 13, 1976, Ser. No. 686,143

Claims priority, application Switzerland, May 20, 1975, 6461/75

Int. Cl.[2] B65G *47/28*

U.S. Cl. 198—459 13 Claims

1. An apparatus for evening an imbricated stream of products, especially printed products, comprising a plurality of revolving entrainment members, each entrainment member engaging a trailing end of an associated one of the printed products, means defining a path of travel for the entrainment members, said entrainment members being movable along said path of travel through a conveying-effective path, means providing a drag connection between the entrainment members, means for guiding the entrainment members at the region of their conveying-effective path, thrust drive means for driving the entrainment members at the start of the conveying-effective path and traction drive means for driving the entrainment members at the end of said conveying-effective path, said drive



means constituting a first controllable drive means at the start of the conveying-effective path for driving said entrainment members in pushing relationship to one another and a second controllable drive means at the end of the conveying-effective path for driving said entrainment members in pulling relationship to one another.

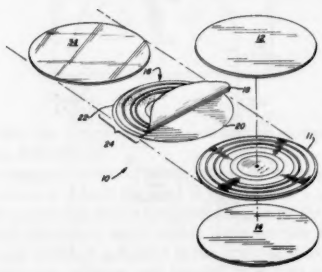
4,072,229
RECORD ALBUM COVER

Peter Lloyd, 11049 Blix St., North Hollywood, Calif. 91602, and Bob Zoell, 14547 Greenleaf St., Sherman Oaks, Calif. 91403

Filed Feb. 20, 1976, Ser. No. 659,680

Int. Cl.[2] B65D *85/30*

U.S. Cl. 206—309 2 Claims



1. A cover for a phonograph record comprising: two circularly shaped discs formed from black, sealable, shiny and flexible polyvinyl chloride, each disc having a diameter greater than the diameter of a phonograph record,

said discs being continuously sealed together for about one-half their circumference so as to provide an open end into which a phonograph record may be inserted and a closed, pocket-like end for receiving a phonograph record,

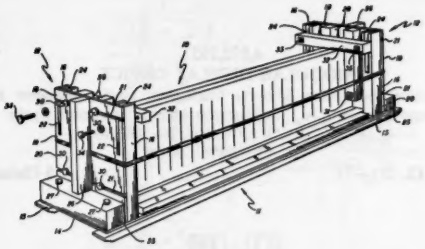
a pair of circular, disc-shaped stiffeners for rigidifying the cover and protecting the phonographic record, the stiffeners being of a diameter less than the diameter of the cover, and

indicia applied to at least one side of the cover, the indicia including record bands, spacing bands and a concentrically placed record label, the indicia providing a record cover which substantially corresponds to a phonograph record housed within the cover, whereby the cover of the phonograph record simulates the phonograph record itself.

4,072,230
ASSEMBLY FOR SUPPORTING DELICATE EQUIPMENT DURING SHIPPING

Vincent R. Mulligan, Syracuse, N.Y., assignor to L. K. Van Keuren Company, Inc., Marcellus, N.Y.

Filed Apr. 20, 1976, Ser. No. 678,614
Int. Cl.[2] B65D *85/48; A47G 19/08*
U.S. Cl. 206—334 7 Claims

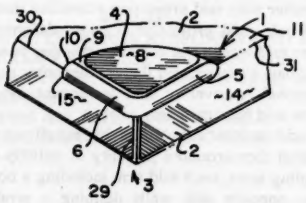


1. A packaging assembly for supporting delicate electronic equipment within an outer carton during shipping, the support assembly comprising a normally horizontal base assembly and a pair of upstanding end braces respectively secured to the base assembly at opposite ends thereof, each end brace having a pair of normally vertical clamping members movable towards or away from one another for engaging and clamping therebetween terminal portions of the equipment being shipped, each end brace also having a normally horizontally disposed member movable towards or away from the base assembly for engaging the equipment being shipped and clamping it between the horizontally disposed member and base assembly.

4,072,231
CORNER PROTECTOR

Hosea W. Helms, 7451 Richmond Place, St. Louis, Mo. 63143

Filed Feb. 17, 1977, Ser. No. 769,514
Int. Cl.[2] B65D *85/48*
U.S. Cl. 206—453 14 Claims



1. A corner protector which is applied to the corners of a second structure, comprising:

an enclosure including a relatively flat top surface area, and a curved portion terminating in an arcuate edge, a first curved side wall, and a second curved side wall, said first and second side walls extending downwardly from said top surface area and terminating in an edge, each edge of said side walls abutting said second structure in the intermounted position of said protector, said enclosure defining an air pocket with said second structure;

a suction cup mounted to a bottom side of said top surface area in said air pocket;

an L-shaped lip outboard of said suction cup in said air pocket;

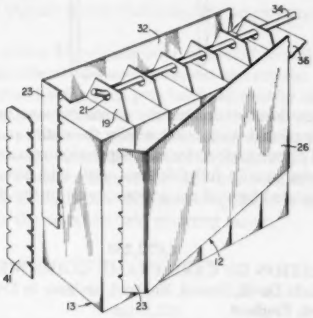
at least one vertical lip extending along the height dimension of each of said side walls; and

double edge adhesive means applied to said L-shaped lip and to each of said vertical lips for ensuring attachment of said corner protector to said second structure.

4,072,232
PACKAGE FOR MULTIPLE CONTAINERS

John W. Marsman, Pokagon Township, Cass County, Mich., and G. Norman Heaton, Elkhart, Ind., assignors to Victor Comptometer Corporation, Chicago, Ill.

Filed Aug. 5, 1976, Ser. No. 712,028
Int. Cl.[2] B65D *5/54, 17/20, 85/54*
U.S. Cl. 206—602 13 Claims



1. In a packing structure for plural elongated containers, each container having a tab projecting from one end thereof and each tab having an opening therethrough and alignable with the openings in the other tabs, the improvement which said structure comprises a first packing sleeve which includes:

a pair of parallel side walls and a pair of parallel end walls integral with and extending between corresponding lateral edges of said side walls to define a first substantially rectangular compartment with opposed opened ends,

a pair of short, parallel perforation lines extending inwardly from one free edge of one end wall and adjacent the side walls whereby to form a flap which can be removed or folded sideways to expose the aligned openings in said tabs whereby an elongated element can be extended therethrough, and

a pair of spaced, parallel perforation lines in one of said end walls, said perforation lines extending between the free edges thereof to define a tear strip which can be readily and manually removed whereby said first packing sleeve can be removed laterally from said containers after they are engaged by said elongated element; and

said packing structure including a second packing sleeve having interconnected side walls and end walls whereby to form a second, rectangular compartment, said first sleeve with said containers therein being slidably positioned within said second sleeve so that the open ends of said first sleeve face toward the end walls of said second sleeve, and said containers are disposed completely within said second sleeve.

4,072,233
CONTAINER WITH FRANGIBLE PIERCING POINT

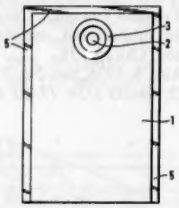
Karl Kramer, Wambach, and Karlheinz Durst, Naurod, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 13, 1976, Ser. No. 714,250
Claims priority, application Germany, Aug. 16, 1975, 7526045[U]
Int. Cl.[2] B65D *5/54*
U.S. Cl. 206—634 9 Claims

1. A container comprising:

a plurality of container walls made of laminated layers of material and defining a closed interior space, one of said

walls having a frangible piercing point thereon arranged to be penetrated by an extraction device or the like, said piercing point being defined by a circumscribing depression formed in the exterior of said wall, and which extends from the outside of said wall toward the inside thereof, but



which does not completely pierce the innermost laminate layer of said wall, substantially the entire portion of said wall circumscribed by said depression remaining in place at substantially full thickness until said piercing point is penetrated by said extraction device or the like.

4,072,234

LOCATION OF CARD FRAME GUIDE MEMBERS

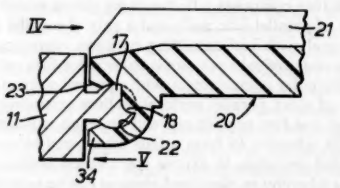
James Earle David, Stroud, England, assignor to Critchley Bros. Limited, England

Filed May 10, 1976, Ser. No. 684,845

Claims priority, application United Kingdom, May 8, 1975, 19350/75

Int. Cl.[2] A47F 7/00

U.S. Cl. 211—41 **11 Claims**



1. An assembly of guide members and support members for a frame construction of the type where the guide members are arranged to lie transversely between a pair of spaced, parallel, elongated support members and are provided with locating means at each end to cooperate with corresponding means on each of the support members, and with a slot to receive an edge of a board, wherein the support members are each provided with a longitudinally extending rib formation which, in cross section, is of rounded form carried by and symmetrically of the axis of a neck portion, and the end of each guide member defines a correspondingly rounded groove formation provided, in cross section, by a pair of flexible arms whose free ends extend towards one another and thus towards the neck portion of the support member so as to create a snap-on connection onto the rounded rib formation of the support member, and wherein complementary locating formations are provided at spaced positions along the rib formation and in each groove formation to prevent relative movement between the rib and groove formations in the longitudinal direction of the rib formation, each locating formation comprising, respectively, a recess defined in the rib formation and opening to one side only of said axis of symmetry of the neck portion and the rib formation and being at least mostly disposed in the part of the rib formation on said one side of said axis of symmetry, and a complementary projection within and extending from the groove formation and disposed at least mostly on said one side of said axis of symmetry, whereby the arms are enabled to flex relative to one another and grip the rib formation even in conditions wherein the locating formations have not already interconnected during assembly operations.

4,072,235

MODULAR DISPLAY DEVICE

Francisco Bermudez Munoz, Cartagena, Spain, assignor to Diego Zamora S.A., San Antonio Abad (Cartagena), Spain

Filed Feb. 23, 1976, Ser. No. 660,404

Int. Cl.[2] A47G 29/00

U.S. Cl. 211—71 **5 Claims**

1. A modular display device comprising:

a base member having extending upwardly therefrom a cylindrical projection having therein axial slots defining inwardly deformable projection portions each having at the upper end thereof an outwardly extending flange;

a plurality of modular members stacked vertically above said base member, the lowermost said modular member having therein a central hole of a diameter approximately equal to the outer diameter of said projection, said projection portions being deformable inwardly to enable said lowermost modular member to be assembled onto said base member with said projection extending through said central hole, said projection portions deforming outwardly after said lowermost modular member is assembled onto said base member, said flanges thereafter preventing unintentional removal of said lowermost modular member from said base member;

each said modular member having equally circumferentially spaced therearound a plurality of radially outwardly extending arms, each said arm including a bottom wall and two opposite side walls defining a product receiving space, each side wall forming a dihedral angle with the adjacent side wall of the adjacent arm, each pair of side walls defining a dihedral angle being joined at the tops thereof by a triangular element, each said triangular element having a free edge with a notch therein, each said arm having depending downwardly therefrom a tongue element;

said tongue elements of each said modular member being received in said notches of the next lower modular member, each said modular member being circumferentially angularly displaced with respect to the next lower modular member, said notches being positioned and dimensioned such that the receipt therein of the tongue elements of the next upper modular member rigidly fixes together the respective said modular members; and

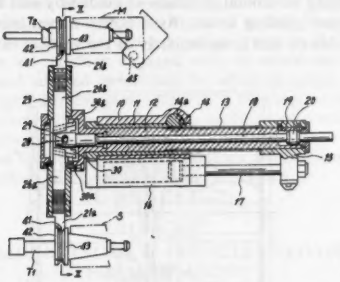
an upper member having depending downwardly therefrom a plurality of tongue elements which fit and are received in the notches of the uppermost of said modular members.

4,072,236

ARTICLE TRANSFER APPARATUS

Kenji Nomura, Aichi; Kengo Yoshioka, and Toshihiro Goto, both of Kariya, all of Japan, assignors to Toyoda-Koki Kabushiki-Kaisha, Kariya, Japan

Filed Jan. 26, 1977, Ser. No. 762,668
Claims priority, application Japan, Feb. 25, 1976, 51-20340
Int. Cl.[2] B65G 47/90
U.S. Cl. 214—1 BB 11 Claims



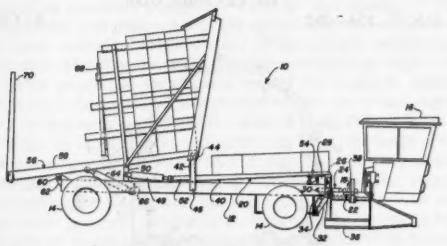
1. An article transfer apparatus comprising in combination:
a main body;
a rotatable shaft rotatably supported by said main body;
first actuation means for rotating said rotatable shaft;
a transfer arm fixedly provided upon one end of said rotatable shaft and extending radially therefrom;
a pair of grippers pivotably provided, respectively, upon each end of said transfer arm so as to simultaneously grip two articles to be transferred;
a wedge member supported at said one end of said rotatable shaft and axially movable relative thereto, said wedge member also being movable floatingly radially of said rotatable shaft;
second actuation means for moving said wedge member axially of said rotatable shaft; and
motion connection means provided upon said transfer arm and mechanically responsive to the axial movement of said wedge member to selectively open and close said pairs of grippers.

4,072,237

TIER COUNTER MEANS RESPONSIVE TO TIER PATTERN STORAGE CAM POSITION

Richard A. Colby, Fresno, Calif., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Aug. 5, 1976, Ser. No. 712,121
Int. Cl.[2] A01D 87/12; B65G 57/32
U.S. Cl. 214—6 B 10 Claims



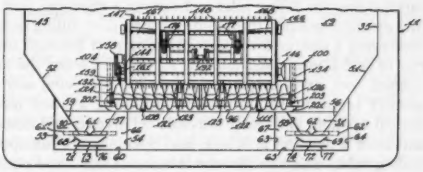
1. In a bale wagon having means for storing a predetermined sequence of a predetermined number of tier patterns, said storing means defining a predetermined number of successive-displaced positions which each represent one of said tier patterns, operable means for forming bales into said predetermined number of tier patterns, said operable means responsive to each of said storing means positions to form the bales into the one of said tier patterns corresponding to each of said storing means positions, a source of electrical power, electrical drive means activatable for rendering said operable means successively responsive to each of said storing means positions, circuitry interconnecting said electrical power source and said drive means which when closed transmits electrical energy from the former to the latter to activate the latter, and means for closing said circuitry after each tier has been formed by said operable means to cause activation of said drive means and render said operable means responsive to the next successive one of said storing means positions, the improvement which comprises:
counting means electrically interconnected to said circuitry and operable to advance one count and register the number of tiers having been previously formed by said operable means each time said operable means is rendered responsive to the next successive one of said storing means positions, said improvement further including a manually actuated switch means electrically interconnected to said circuitry and said counting means operable to selectively advance the count on said counting means.

4,072,238

SELF-UNLOADING SHIP WITH TWO TUNNEL BELTS AND A CENTRAL RECLAIMER

Warren R. Vaughan, Belleville, Canada, assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Nov. 24, 1976, Ser. No. 744,516
Int. Cl.[2] B63B 27/22
U.S. Cl. 214—15 E 8 Claims



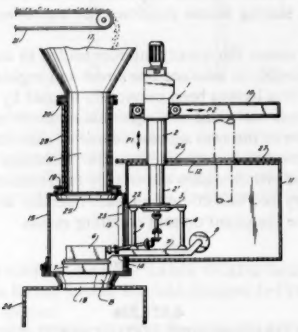
1. In a self-unloading ship for transporting bulk material,
a cargo carrying mid-ship section between the bow and stern of said ship including
walls defining two substantially parallel rows of hoppers in the bottom of said mid-ship section in laterally spaced relation to one another, and
a flat floor between said rows of hoppers, the elevation of said floor being at least as high as said hoppers,
gates at the bottom of said hoppers shiftable between closed and open positions,
walls defining a tunnel below each of said rows of hoppers,
an endless belt conveyor in each of said tunnels, each conveyor having an endless belt with a working run disposed below the gates of the associated row of hoppers, said conveyors being substantially parallel to one another.
a vehicular reclaimer supported on said floor by a plurality of wheels and adapted to operate in a fore and aft direction, said reclaimer being slightly wider than said floor and substantially narrower than said mid-ship section and including auger means rotatable about a transverse axis including oppositely pitched flights for splitting bulk material resting on said floor and simultaneously moving it in opposite lateral outboard directions to said rows of hoppers and
power means for selectively moving said reclaimer in said fore and aft directions.

4,072,239

ARRANGEMENT FOR CHARGING A FURNACE IN A GASTIGHT AND DUST-TIGHT MANNER

Willi Busbach, Essen, Germany, assignor to Bergwerksverband GmbH and Didier Engineering GmbH, both of Essen, Germany

Filed Feb. 7, 1977, Ser. No. 765,893
Claims priority, application Germany, Feb. 10, 1976, 7603726[U]
Int. Cl.[2] F23K 3/00
U.S. Cl. 214—35 R 7 Claims



1. In combination with a furnace having a furnace filling inlet normally closed by a removable cover, an arrangement for opening the filling inlet, then filling the interior of the furnace, and then reclosing the inlet all in gas-tight and dust-tight manner in order to prevent the free escape of dust and gases to the ambient atmosphere when the cover is removed from the filling inlet, the arrangement comprising a housing surrounding the filling inlet and having a charging port and a first opening separate from said charging port; filling means for conveying a charge from said charging port through the interior of said housing and into the filling inlet when the latter is opened; and cover-extracting means for removing and subsequently repositioning the cover, including a hood having a second opening and being movable relative to said housing to and from a position in which said openings are juxtaposed in sealing relationship so that the interior of said hood communicates with the interior of said housing, said cover-extracting means also includes means mounted on said hood for engaging the cover so as to open and subsequently reclose the filling inlet, said engaging means being movable from the interior of said hood through said juxtaposed openings to the interior of said housing at a location adjacent the cover for engagement with the latter so that any dust and gas escaping from the filling inlet towards the ambient atmosphere when the cover is removed from the filling inlet are confined within the respective interiors of said housing and said hood.

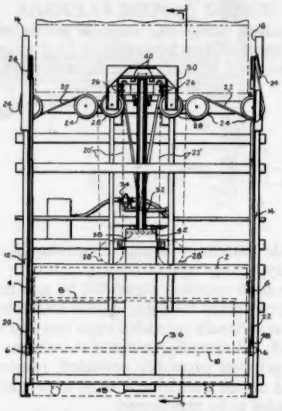
4,072,240

TEXTILE BOBBIN HOIST

Richard Ferguson, and Kenneth W. Troutman, both of Charlotte, N.C., assignors to The Terrell Machine Company, Charlotte, N.C.

Filed Oct. 18, 1976, Ser. No. 733,390
Int. Cl.[2] B65G 65/04
U.S. Cl. 214—313 10 Claims

1. A bobbin hoist having a skip for holding a box of bobbins for hoisting, air powered cable means attached to the skip for lifting and lowering thereof, complementary track guide means for separately engaging and guiding top and bottom portions of the skip for generally vertical hoisting thereof followed by tilting thereof to dump the bobbins therefrom, the skip being located for said vertical hoisting generally on the rear side of said track guide means, said track guide means having upper curved portions thereof for causing the skip to turn at least ninety degrees from its original disposition to dump at the front side of said track guide means, said top portion track guiding means guiding said top portion of the skip to initially tilt the skip during hoisting thereof and said bottom portion track guiding means guiding said bottom portion of the skip for completion of said tilting of the skip during hoisting thereof and after said initial tilting thereof the skip being essentially unrestrained in horizontal direction by said top portion track guiding means and thus free to move in essentially horizontal direction as guided by said bottom portion track guiding means, fixed pulley means located on the front side of, and intermediately of the vertical extent of, said



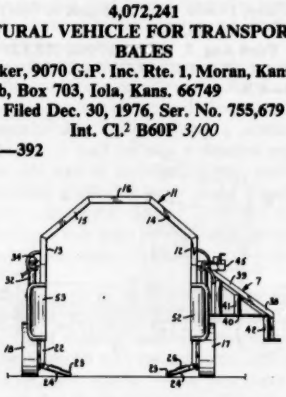
bottom portion track guiding means for guiding said cable means so that the line of pull of said cable means at said skip forms an ever decreasing angle with the normals to said bottom portion track guiding means at the locations where said bottom portion is guided during said completion of said tilting whereby an ever increasing load is applied by said bottom portion of the skip on said bottom portion track guiding means during said completion of said tilting, and said guide means controlling the tilting so that the tilting is effected by substantially constantly increasing cable means pulling force for smoothly controlling the ascent, and conversely the descent of the skip.

4,072,241

AGRICULTURAL VEHICLE FOR TRANSPORTING HAY BALES

Gary D. Parker, 9070 G.P. Inc. Rte. 1, Moran, Kans. 66755, and E. S. Robb, Box 703, Iola, Kans. 66749

Filed Dec. 30, 1976, Ser. No. 755,679
Int. Cl.[2] B60P 3/00
U.S. Cl. 214—392 13 Claims



1. An agricultural vehicle for transporting round bales and comprising:

a. a mobile frame for movement over the ground and having a forward end and a trailing end, said frame having longi-

tudinally extending side members and a plurality of transverse members;

b. longitudinally extending bale lifting and supporting members arranged in a laterally opposed pair, each bale supporting member depending from at least one of said members of said frame at a side thereof and movably mounted thereon;

c. means on said frame and operatively connected to said bale supporting members for moving same between a depending position and an inwardly inclined bale supporting position, said bale supporting members respectively including an arm pivotally mounted to said frame at one end thereof for pivotal movement transversally of said frame, an extension engaged with the other end of said arm and adapted to increase the effective length of said arm upon movement of said arm to bale supporting position thereby lifting a bale substantially out of contact with the ground for transport; and

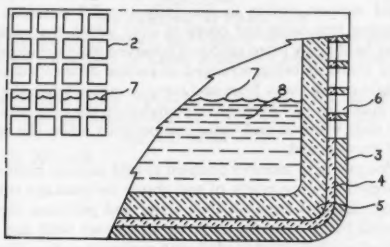
d. means for connecting said frame to a prime mover for propelling said mobile frame.

4,072,242

UNLOADING TAILGATE FOR SELF-UNLOADING FORAGE WAGON

Franklin F. Cook, Rte. 2, Baraboo, Wis. 53913

Filed Apr. 30, 1975, Ser. No. 573,041
Int. Cl.[2] B60P *1/38*
U.S. Cl. 214—522 **3 Claims**



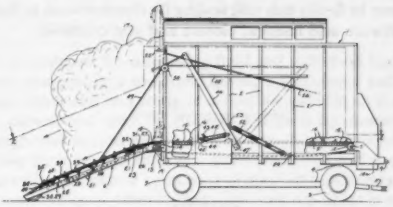
1. An unloading tailgate for a self-unloading chopper wagon to increase the versatility of the wagon which comprises a wagon box having a floor supported on a chassis in turn supported on wheels with the floor of the wagon located above the uppermost extent of the wheels of the wagon and adapted at the forward end to be hitched to a tractor, at least one unloading chain supported by rear and forward shafts disposed in said box and adapted to be driven rearwardly over the floor of the box when the shafts are rotated from the tractor, upstanding members intermittently secured to the chain to engage the bottom of a load of material located in the wagon and unload the material rearwardly when the chain is rotated, a single door at the rear of the wagon consisting of an unloading tailgate hinged at the lower end to the rear of the wagon and extending upwardly completely over the rear opening in the wagon box, a plurality of laterally spaced inverted supporting channels extending longitudinally of the tailgate, reinforcing stringers extending across the top of the channels, an angle iron member secured to the forward end of the channels, hinges secured to the angle iron and pivoted to the rear of the wagon box for pivotal movement of the tailgate, and a flat guide plate secured to the stringers and extending over the angle iron members substantially to the floor of the wagon box to provide a smooth surface for discharging the load of material, means secured to the tailgate and the wagon and actuated from the tractor to pivot the tailgate to a closed position or swing the tailgate so that it gradually slopes from the rear of the box to the ground, and at least one unloading chain revolved rearwardly over the tailgate by the unloading chain in the box and having upstanding means intermittently secured thereto to engage and unload the load of material received from the box onto the ground, the said tailgate having a minimum angle of slope from the rear of the wagon to the ground to unload the stored material without cracking or otherwise damaging the load of material and thereby subject it to disintegration or deterioration by the elements as the tractor pulls the chopper wagon forwardly.

4,072,243

METAL COATED BRITTLE CONTAINERS, CONDUITS AND OTHER OBJECTS FOR LABORATORY AND INDUSTRY

Louis A. Conant; Wilbur Monroe Bolton, both of Rochester, and James Ellsworth Wilson, Livonia, all of N.Y., assignors to Intertec Associates, Inc., Rochester, N.Y.

Continuation-in-part of Ser. No. 568,422, April 21, 1975, abandoned. This application Dec. 23, 1976, Ser. No. 754,036
Int. Cl.[2] B65D *15/10, 25/14;* **B01L** *3/00, 11/02*
U.S. Cl. 215—12 R **15 Claims**



1. In an armored brittle-ware article selected from the group consisting of laboratory and industrial brittle-ware coated externally with a layer of metal, the improvement which comprises an anti-bonding layer between the natural surface of said brittle-ware and said layer of metal; said anti-bonding layer being selected from the group consisting of thermally stable finely divided particles and thermally stable polymers, and said layer of metal being plated by chemical vapor deposition at an elevated temperature of at least about 150° F over substantially the entire outer surface of said article; the brittle material of said article being under a compressive force at room temperature over the entire inert brittle-ware article, caused by the greater shrinkage of said metal layer than said brittle material when the temperature of said article is lowered from an elevated temperature at which said metal layer was applied to said brittle-ware to room temperature; said coated brittle-ware having shock resistance, substantially increased pressure tolerance and an impact strength of at least about 5 times greater than that of similar uncoated brittle-ware.

4,072,244

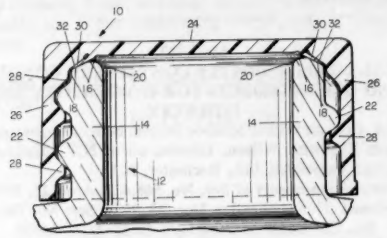
LINERLESS CLOSURE

Bruce M. Mueller, Sylvania, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 4, 1977, Ser. No. 765,501
Int. Cl.[2] B65D *53/00*
U.S. Cl. 215—344 **1 Claim**

1. In combination: a container having an externally threaded neck portion terminating at its end in an annular rim defining the periphery of an open mouth, said rim including a sealing surface tapering downwardly and outwardly from said open mouth; and a linerless closure comprising a top panel, an internally threaded skirt depending from said top panel and adapted to engage the threaded neck portion of said container, an annular resilient sealing fin depending downwardly and outwardly from the inside surface of said top panel, said annular sealing fin adapted to sealingly engage said sealing surface on the annular rim of the neck portion of the container, said linerless closure including an annular stop portion formed integral therewith at the interior junction of the top panel and the

depending skirt, said stop portion being inclined downwardly and outwardly from said top panel to stop the upward and outward deflection of said annular sealing fin upon application



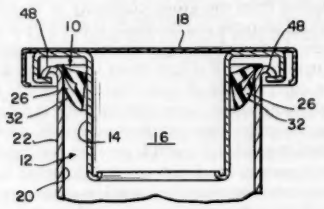
of said closure to said container to thereby cooperate with the sealing surface on the annular rim of the neck portion of the container to firmly bias said sealing fin therebetween to form a seal between said linerless closure and said container.

4,072,245

FILLER NECK CAP WITH O-RING SEAL

Paul H. Sloan, Jr., Sturgis, Mich., assignor to Stant Manufacturing Company, Inc., Connersville, Ind.

Filed July 16, 1976, Ser. No. 706,051
Int. Cl.[2] B65D *41/02*
U.S. Cl. 220—295 **3 Claims**



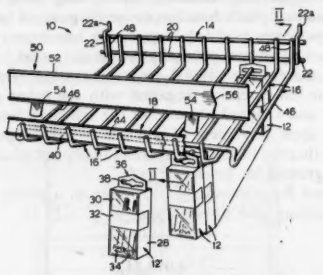
1. For use with a filler neck having an axially outer end and a filler neck cap having a shank portion extending axially into the filler neck when the cap is in its use position, the shank providing a first radially inner surface and the filler neck providing a second radially outer surface, the first and second surfaces defining therebetween an annular space, a resilient annular ring for sealing the annular space, the ring being mounted on the shank, the annular space having a radial width less than the radial dimension of the ring, the ring including an axially inner lip, an axially outer lip, and a connecting radially inner web portion, the lips and web defining an annular, radially outwardly facing groove in the ring, the inner lip including axially inner and outer surfaces, the web portion including a radially inwardly facing surface adjacent the first surface and a radially outwardly facing surface, and the outer lip including axially inner and outer surfaces, the improvement wherein the inner lip inner surface is formed for resilient axially outward wiping movement by the second surface upon axially inward movement of the shank with the ring mounted thereon into the filler neck, the web radially inner surface being resiliently deflected radially outwardly at its axially inner extent and being urged radially inwardly against the radially inner surface at its axially outer extent.

4,072,246

DISPLAY RACK

Arthur Paulin, 7 High Point Road, Don Mills, Canada (M2B 2A3)

Filed Jan. 26, 1977, Ser. No. 762,618
Int. Cl.[2] A47F *1/12*
U.S. Cl. 221—307 **7 Claims**



1. A display rack for packages of hardware and like articles, the rack comprising:

support means;

a plurality of elongate elements from which the packages can be suspended, the elements projecting outwardly from said support means in generally parallel positions and having free outer end portions over which the packages can be slidably fitted onto and removed from the elements, the elements being arranged to incline downwardly to a slight extent away from said support means when the rack is in use, so that packages suspended on the elements tend to slide towards said outer end portions under the action of gravity; and,

an elongate stop member coupled to said support means and extending transversely of and above the package suspension elements adjacent their outer end portions, the elements being normally disposed in contact with said stop member when fully loaded with packages so that the stop member prevents the packages sliding off the elements, and the elements being resiliently deflectable away from the stop member to permit removal of the packages.

4,072,247

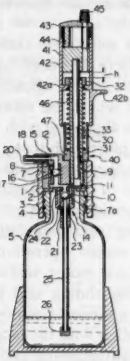
LIQUID DISPENSING DEVICE

Seichi Yamazaki, Kashiwa, Japan, assignor to Nippon Glass Measure Co., Ltd., Tokyo, Japan

Filed June 24, 1976, Ser. No. 699,575
Claims priority, application Japan, Feb. 19, 1976, 51-18597[U]
Int. Cl.[2] B67D *5/22*
U.S. Cl. 222—47 **11 Claims**

1. A liquid dispensing device comprising a cap structure adapted to be mounted on the top of a liquid container, a cylinder extending vertically upward from the cap structure, a manually operable plunger slidably fitted in the cylinder, means for controlling the stroke of the sliding movement of the plunger within the cylinder, a delivery assembly including a one-way delivery valve and a delivery nozzle, and a suction assembly including a one-way suction valve and a suction tube extending into the liquid in the liquid container, said delivery assembly and suction assembly being respectively removably force fitted into respective bores formed in the upper portion and the lower portion of the cap structure, said bores communicate with each other and with the interior of said cylinder, said stroke controlling means comprising a head of increased diameter formed on the upper end of the plunger for engaging with the upper end of the cylinder to prevent the downward movement of the plunger, a sleeve receiving the head of the plunger slidably therein, one or more gauge members being selected from a series of gauge members each having a predetermined thickness and being located and clamped between the

head of the plunger and a cap member closing the upper end of the sleeve, and a projection formed on the inner periphery of



the sleeve for cooperating with a stop member formed on the cylinder to restrict the upward movement of the sleeve relative to the cylinder.

4,072,248

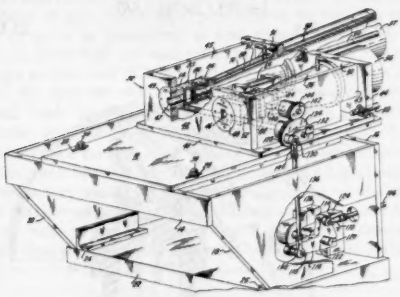
METERING APPARATUS

John E. Murphy, Oradell, and Chester Wolf, Bergenfield, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 522,791, Nov. 11, 1974, abandoned. This application Feb. 12, 1976, Ser. No. 657,435

Int. Cl.[2] A01J *21/00*

U.S. Cl. 222—56 **5 Claims**



1. A margarine metering apparatus for use in a margarine processing machine comprising:

a. a first and a second positive open and closed valve mechanism communicatively mounted to each other, and having an inlet communicatively mounted between said first valve mechanism and a source of margarine;

b. an expansion tube, the interior cavity of which has the general shape of a frustum, the smaller end of said cavity being communicatively engaged with the exit of said second valve mechanism for the passage of margarine therethrough;

c. a first drive mechanism that is operably connected to and intermittently and synchronously opens and closes said second valve mechanism to continuously meter the passage of margarine therethrough; and

d. a second drive mechanism that is operably connected to said first valve mechanism,

said second drive mechanism maintaining said first valve mechanism in a position to admit the passage of margarine therethrough and being capable of closing said first valve mechanism to the admission of margarine when said first drive mechanism ceases to function.

4,072,249

CONTAINER SUITABLE FOR SMALLER QUANTITIES OF FLUID OR SEMIFLUID SUBSTANCES

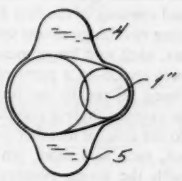
Bo Thuresson Af Ekenstam, Molndal, and Erik Gustaf Percy Nordqvist, Saro, both of Sweden, assignors to Landstingens Inkopscentral, Solna, Sweden

Filed Feb. 25, 1976, Ser. No. 661,177

Claims priority, application Sweden, Mar. 3, 1975, 7502318

Int. Cl.[2] B65D *25/38*

U.S. Cl. 222—95 **11 Claims**



1. A container for dispensing fluid and semi-fluid liquids or pastes, comprising: a top dome having a first closed end and a second open end and made of a flexible material so that said first closed end may be pressed downwardly toward and through said second open end; a bottom dome also made of a flexible material and having a first closed end and a second open end, said second open ends of each of said domes being connected to each other so that when said top dome is pressed downwardly said first closed end of said top dome passes through said second open end of said top dome and said second open end of said bottom dome toward said first closed end of said bottom dome; means located on said bottom dome near said first closed end thereof for allowing the contents in said top and bottom domes to exit thereform to a desired point outside of said container; flange means surrounding said top and bottom domes near said connected second open ends for gripping by fingers so that the contents of the container may be forced outwardly through said means for allowing when a thumb presses downwardly upon said first closed end of said top dome to thereby force said top dome into said bottom dome while at the same time forcing the contents out through said means; and an envelope surrounding said bottom dome and made of a rigid material to thereby support said bottom dome when said top dome is pressed and forced thereinto, said flange means being mounted about said envelope.

4,072,250

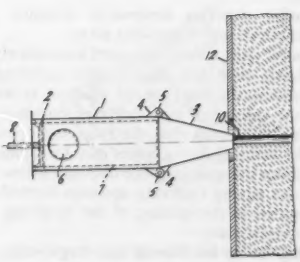
APPARATUS FOR PLUGGING HOLES IN AN ELECTRIC SMELTING FURNACE OR THE LIKE

Thor Pedersen, Vagsbygd, and Aksel Erik Kristiansen, Oslo, both of Norway, assignors to Elkem-Spigerverket A/S, Oslo, Norway

Continuation-in-part of Ser. No. 563,200, March 28, 1975. This application July 15, 1976, Ser. No. 705,573

Int. Cl.[2] C21B *7 /12*

U.S. Cl. 222—326 **2 Claims**



1. Apparatus for plugging holes in an electric smelting fur-

nace or the like comprising a tubular member open at a first end thereof, a piston operatively associated with said tubular member being sized and adapted to be inserted therein and displaced along the longitudinal axis thereof, a second, generally conical member having accessible openings at the axial extremes thereof, a first accessible opening being dimensioned to be urged into contact with the opening of the first end of said tubular member and a second accessible opening being dimensioned according to a predetermined size based on the size of a hole to be plugged, and means joining said tubular member to said conical member with the said first accessible opening and said opening of the first end being in register, said means comprising two hinge means spaced approximately 180° from each other, each said hinge means comprising cooperating leaf members joined by a taper pin, one leaf of each said hinge means being affixed to the tubular member and being mounted on the exterior thereof and the other said leaf member being affixed to the conical member and being mounted on the exterior thereof, each said taper pin being free of threaded engagement with the hinge members and being removable upon the application of one or more sharp blows, the axes of said two taper pins being substantially parallel to each other said axes being substantially vertical, removal of one or the other of said taper pins permitting the conical member to be rotated in a horizontal direction either to the left or to the right about the vertical axis of the other said taper pin to a point where the entire cross-sectional area of the said opening of the first end of the tubular member is exposed and unobstructed by the conical member and removal of both said taper pins permitting separation of the said conical member from the said tubular member.

4,072,251

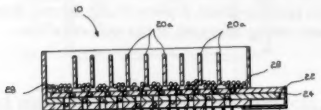
AUTOMATIC SEED SINGULATING AND DISPENSING APPARATUS

Barney K. Huang, 5108 Kaplan Drive, Raleigh, N.C. 27606

Continuation of Ser. No. 479,618, June 17, 1974, abandoned. This application July 23, 1976, Ser. No. 708,129

Int. Cl.[2] G01F *11/10*

U.S. Cl. 222—333 **3 Claims**



1. A singulating and dispensing apparatus comprising:

(a) a hopper;

(b) a singulating plate slidably mounted within said hopper and generally forming the bottom thereof, said singulating plate having a plurality of receiving openings formed therein;

(c) a buffer structure stationarily mounted within said hopper above said singulating plate;

(d) a transfer plate slidably mounted immediately below said singulating plate, said transfer plate including a plurality of receiving openings spaced apart so as to correspond with the spacing of said receiving openings of said singulating plate such that the receiving openings of said transfer and singulating plates may be aligned;

(e) a stationary dispensing plate disposed below said transfer plate and having receiving openings formed therein that correspond to the spacing of the receiving openings of said transfer plate;

(f) biasing means for biasing said singulating and transfer plates to an initial position where the receiving openings of each are in alignment and offset relative to the receiving openings formed within said stationary dispensing plate;

(g) means for reciprocally sliding said singulating plate back and forth after each transfer from said singulating plate to said dispensing plate; and

(h) control means for selectively shifting said transfer plate from a position where the receiving openings therein are aligned with the receiving openings of said singulating plate to a position where the receiving openings of said transfer plate are in alignment with the receiving openings of said dispensing plate such that a transfer may be made from the receiving openings of said singulating plate to the receiving openings of said dispensing plate, said control means for shifting said transfer plate and said means for reciprocally sliding said singulating plate including a common linkage means operatively connected to and actuated by an electric motor, said common linkage means including means for sliding said transfer plate from its initial position to a second position where the receiving openings thereof align with the receiving openings of said dispensing plate and returning said transfer plate back to said initial position, and wherein said common linkage means is adapted to move said singulating plate from said initial position to a second position in response to said transfer plate being moved back from said second position to said initial position.

4,072,252

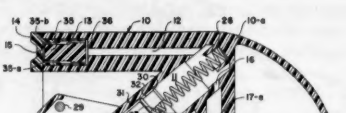
HAND OPERATED SPRAYER WITH AUTOMATIC CONTAINER VENT

Emile B. Steyns, Helmond, Netherlands, and Jerry H. Miller, Miami Lakes, Fla., assignors to The AFA Corporation, Miami Lakes, Fla.

Continuation-in-part of Ser. No. 656,547, Feb. 9, 1976, abandoned. This application June 7, 1976, Ser. No. 693,383

Int. Cl.[2] B67D *5/40*

U.S. Cl. 222—341 **22 Claims**



1. A manually operated liquid dispenser adapted to be attached to a container holding a liquid to be dispensed comprising

a. component retaining body means, the bulk of which is located outside of said container when attached thereto,

b. an outwardly opening bore defined within the interior of the component retaining body means,

c. a piston shiftable within the bore and bounding a variable compartment with said bore,

d. inlet and outlet means disposed within the component retaining body means for delivering liquid into and out of the compartment bounded by the piston and bore,

e. operating means, including a trigger normally actuated by the application of substantially horizontal force by the fingers thereto, for shifting the piston within the bore between a normal, non-pumping position and a pumping position,

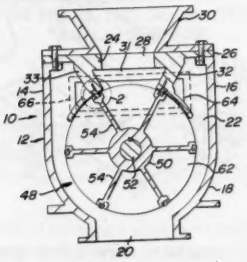
f. venting means extending through the body means and opening, at one end, into the bore, and

g. a single unit providing seal means for the venting means, the seal means and the compartment, in normal non-pumping position, preventing communication to the ambient air from the venting means and the compartment, thereby forming a positive closure for the container, the seal means in pumping position permitting free communication between the venting means and the ambient air.

4,072,253
ROTARY FEEDER

Thomas Walters, Jr., Primos, Pa., assignor to Ecolaire Incorporated, Philadelphia, Pa.

Filed Jan. 26, 1976, Ser. No. 652,351
Int. Cl.[2] G01F *11/10*
U.S. Cl. 222—368 **12 Claims**



8. A rotary feeder for feeding abrasive material at temperatures up to about 2300° F. comprising a housing having an inlet and an outlet, a stator having an arcuate surface within said housing, a rotor in said housing for moving material from said inlet to said outlet, said rotor having a plurality of blades, the periphery of each blade being positionable by rotation of the rotor so as to be juxtaposed to said arcuate surface on said stator, a drive shaft for said rotor, said drive shaft extending through an end wall of said housing for connection to a drive motor, the improvement comprising the terminal end portion of each blade having a recess receiving a high temperature refractory insert with a surface of the insert being exposed, said arcuate surface on said stator having a pair of spaced parallel recesses, each of the stator recesses receiving a high temperature refractory insert with an exposed surface on the stator insert juxtaposed to the exposed surface on one of the blade inserts, each of the inserts having a transverse dimension greater than the transverse dimension of its exposed surface.

4,072,254
DISPENSING GUNS

John Patrick Anthony Cox, Eddington, England, assignor to P.C. Cox (Mastic Appliances) Limited, Newbury, England

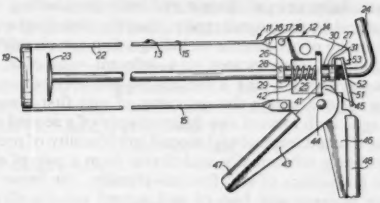
Filed July 7, 1976, Ser. No. 703,262
Int. Cl.[2] G01F *11/00*
U.S. Cl. 222—391 **6 Claims**

1. A dispensing gun for dispensing viscous material from a generally cylindrical cartridge, the gun comprising:

a generally plate-like stock formed from sheet metal;

a cartridge holder projecting from one edge of said stock;

a rod mounted in said stock by being engaged on one side by a first bridge bounded by edges generally perpendicular to the axis of the rod and by ends which merge into the remainder of said stock and being engaged on the side opposite to said one side by two other bridges, each bounded by edges generally perpendicular to the axis of the rod and by ends which merge into the remainder of said stock, said three bridges being spaced longitudinally along said rod with said first bridge between said two other bridges, said first bridge being displaced from the general plane of the stock in one direction and said two other bridges being displaced from the general plane of the stock in the opposite direction, whereby the rod is

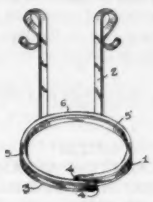


movable longitudinally of itself with its axis extending substantially in or parallel with the plane of said stock; and means for advancing said rod longitudinally of itself.

4,072,255
DEVICE FOR APPLYING OR REMOVING SUPPORT STOCKINGS

Alissa Pam Bogorad, 120 E. 34th St., New York, N.Y. 10016

Filed May 11, 1977, Ser. No. 795,959
Int. Cl.[2] A47J *51/06*
U.S. Cl. 223—111 **2 Claims**



1. A device for applying or removing anti-embolism support stockings comprising

a circular-like band of flexible, polymer impregnated fabric having free ends in close, overlapping relationship whereby the dimensions of the band may be adjusted as desired,

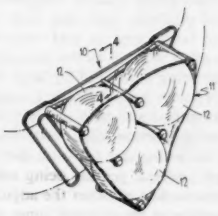
a pair of handles made of said fabric and secured to said band on the side opposite to said overlapping ends,

and separate protective means secured to all fully exposed edges of said band.

4,072,256
GAME BALL HOLDER

Daniel L. Young, 3250 Plumas St. No. 116, Reno, Nev. 89509

Filed June 1, 1976, Ser. No. 691,791
Int. Cl.[2] A63B *49/00*
U.S. Cl. 224—5 D **12 Claims**



1. A portable device capable of holding a plurality of balls, said device comprising:

a unitary substantially flat base member having a facing surface, a reverse surface, a plurality of elongate projections extending from said facing surface in a direction substantially normal thereto and each terminating in a distal end having an enlarged portion for clenching a ball,

said plurality of projections including a first sub-plurality of projections, each located at a different apex of a first isosceles triangle, and a second sub-plurality of projections located within the perimeter of said first isosceles triangle, each located at a different apex of a second isosceles triangle, each of said second sub-plurality of projections being substantially equi-distant from a pair of adjacent projections of said first sub-plurality, the linear distance between any two of said second sub-plurality of projections being less than the linear distance between the mid-points of each line joining a pair of said projections of said first sub-plurality,

each of said projections of said first sub-plurality and the two of said projections of said second sub-plurality in closest proximity being arranged at points on one of a plurality of circles in a plane parallel to said facing surface, each one of said circles having a radius substantially equal to the radius of a ball, each of said projections of said second sub-plurality being arranged at a point on two of said circles,

a plurality of pairs of reinforcement rib portions extending along said facing surface with each of said pairs associated to a different one of said projections of said first sub-plurality, each one of said rib portions of a given pair extending between the associated projection of said first sub-plurality and a different one of the two projections of said second sub-plurality in closest proximity to said associated projection, and

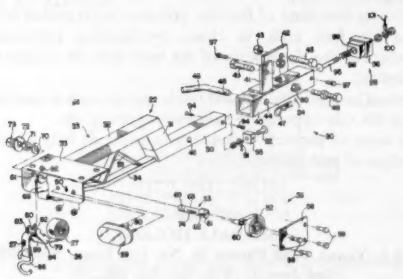
means for attaching said device to a carrying member.

4,072,257

LOAD CARRYING APPARATUS

Robert Eugene Hall, 4187 Mogadore Road, Kent, Ohio 44240

Filed Feb. 17, 1976, Ser. No. 658,409
Int. Cl.[2] B60R *9/10*
U.S. Cl. 224—29 R **8 Claims**



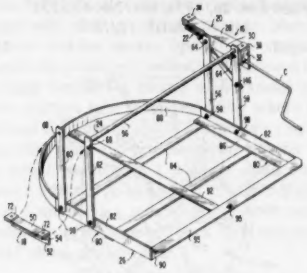
1. A load carrying apparatus selectively attachable to a vehicle for carrying a load on a platform, said apparatus comprising a pair of transversely spaced, longitudinally extending struts carrying said platform, each said strut having an inner portion adapted to be secured to said vehicle by telescopic insertion into a bracket secured to the underside of said vehicle, each said strut being a stepped biplanar element wherein said inner strut portion is longitudinally extending and carries an upwardly directed pedestal portion supporting a longitudinally extending outer portion each said outer strut portion being adapted for mounting said platform thereon, the longitudinal extent of said pedestal portion being substantially twice the transverse cross-section of either the adjacent outer end of said inner strut portion or the adjacent inner end of said outer strut portion, and a longitudinal truss element extends below said outer strut portion from the outer end thereof to said outer end of said inner strut portion, each said truss element comprising a substantially horizontally oriented inner portion and an upwardly inclined outer portion, whereby the under surface of said truss element also functions as a protective rail or skid causing said apparatus to ride up or over a low lying obstacle unintentionally encountered when said vehicle is moving.

4,072,258

RETRACTABLE UNITARY COMPACT SPARE TIRE CARRIER ASSEMBLY FOR UNDERBODY MOUNTING TO A PICKUP TRUCK OR THE LIKE

Doyle D. Cruson, 10713 Hawn Freeway, Dallas, Tex. 75217

Filed Mar. 22, 1976, Ser. No. 668,997
Int. Cl.[2] B62D *43/04*
U.S. Cl. 224—42.21 **2 Claims**



1. A compact, retractable screw driven spare tire carrier assembly for underbody mounting to a pickup truck or the like, said truck having laterally opposed chassis frame members on respective sides thereof, said assembly comprising: first and second mounting brackets mounted to the underside of respective frame members in laterally opposed positions, said first bracket being of inverted U-shape including inner and outer vertical bracket sidewalls, said second bracket being of inverted L-shape and including a vertical bracket wall corresponding to one of said inner and outer vertical sidewalls of said inverted U-shaped bracket, a flat tire carrier rack comprising laterally spaced upstanding sidewalls at positions underlying vertical sidewalls of respective brackets, laterally opposed pairs of hanger arms, including generally equal length forward and rear hanger arms, each arm being pivoted at one end to a respective bracket vertical wall and to a corresponding carrier rack sidewall to maintain the carrier rack in horizontal position and to define a parallelogram support for said rack, a screw drive mechanism mounted to said first bracket between said inner and outer vertical bracket sidewalls, said first bracket having its outer vertical sidewall extending longitudinally forwardly beyond the inner vertical bracket sidewall, one pair of hanger arms being pivotally coupled at their upper ends respectively to said first bracket inner vertical sidewall at respective ends thereof, said screw drive mechanism comprising an elongated, C-shaped nut guide member, and elongated screw mounted for rotation about its axis within said C-shaped nut guide member with said C-shaped nut guide member having an open side facing away from the first bracket outer vertical sidewall, said screw comprising a threaded shaft rotably mounted at respective ends of said C-shaped guide member, a nut threadably mounted on said screw and being of cubic form and restrained on three faces by contact with right angle walls of said C-shaped guide member and to thereby prevent rotation of the nut and to cause said nut to translate along the screw axis as the screw rotates, an elongated drive lever pivotally coupled at one end to the exposed laterally inside face of said nut at the other end to the adjacent rear hanger arm longitudinally rearwardly beyond the end of said guide member and means for fixedly mounting the respective ends of the guide member to the first bracket outer vertical sidewall facing said first bracket inner sidewall at respective locations both forwardly and rearwardly of the adjacent forward hanger arm

such that said inverted U-shaped first bracket shields said screw mechanism from excessive amounts of dirt and crud and protects that mechanism mechanically against damage during vehicle operation, whereby the rotation of the screw in one direction causes the carrier rack and spare tire to be lifted vertically and retracted beneath the vehicle chassis between the truck underbody and in the other direction to lower the carrier rack and the spare tire and to partially extend the rack and spare tire rearwardly, while maintaining the carrier rack and space tire horizontal during such movement.

4,072,259

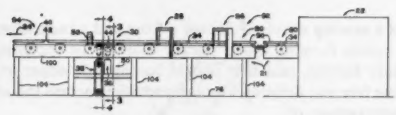
METHOD OF AND APPARATUS FOR OPENING SCORES IN A GLASS SHEET

Sanford M. Welton, Mount Holly Springs, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 25, 1977, Ser. No. 772,363

Int. Cl.² B26F *3/00*

U.S. Cl. 225—2 **19 Claims**



1. In a method of severing a glass sheet having two opposed edges in compression relative to center of the glass sheet, wherein the method includes the steps of scoring the sheet between the opposed edges in compression with a score along an intended path of cut, and applying a bending moment at a first position about the score to sever the glass sheet, the improvement comprising:

applying tension to the glass sheet adjacent at least a one of the edges in compression at a second position spaced from the first position; while

practicing the step of applying a bending moment about the score.

4,072,260

APPARATUS FOR TRANSPORTING AN ELONGATE PIECE OF MATERIAL

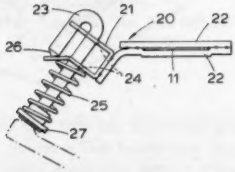
Michael David Dove, Cambridgeshire, England, assignor to Wainco Products Limited, England

Filed Oct. 1, 1976, Ser. No. 728,765

Claims priority, application United Kingdom, Jan. 5, 1976, 134/76

Int. Cl.² B65H *5/14, 17/34*

U.S. Cl. 226—173 **6 Claims**



6. An apparatus for transporting an elongate piece of material along a predetermined path comprising a flexible endless belt, a plurality of spaced clips secured to the belt, each engaging a laterial edge region of the material, guide means for guiding the belt along the predetermined path, drive means for applying drive to the belt, each clip including spring means to bias it to a material-engaging position, the material-engaging means being movable by said spring means in a direction to define an obtuse angle with the plane of flexible belt.

4,072,261

PISTOL APPARATUS FOR DRIVING TACKS, NAILS AND THE LIKE INTO MATERIAL

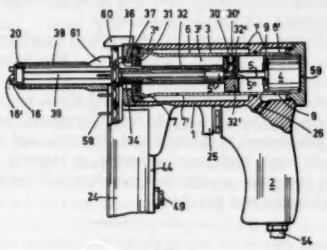
Knut M. A. Livio, Varese, Italy, assignor to Intertack Anstalt, Vaduz, Liechtenstein

Continuation-in-part of Ser. No. 593,459, July 7, 1975, abandoned. This application Nov. 16, 1976, Ser. No. 742,507

Claims priority, application Switzerland, July 22, 1974, 10029/74; May 29, 1975, 6949/75

Int. Cl.² B25C *1/04*

U.S. Cl. 227—130 **7 Claims**



1. Pistol apparatus for driving in tacks, comprising in combination a magazine adapted to receive at least one set of tacks arranged with their stems parallel and attached to one another indirectly by means of a strip of detachably interconnected cylindrical casings each holding a tack, the pistol comprising a barrel having a bore which has the same internal diameter as the external diameter of the casings, plunger means reciprocable in the barrel means to apply compressed air to the plunger means to reciprocate the plunger means relative to the barrel to detach a casing and its tack from the set and to cause both to advance through the bore and to detach the tack from the casing and to drive in the stem of the tack into material to be tacked, means on the plunger means to retract the empty casing to a position in line with said strip, means to feed the strip into the path of said plunger means whereby the advancing strip pushes said empty casing to a position out of alignment with said barrel, and a protuberance on the plunger means to contact and expel the empty casing of the tack previously driven upon advance of the plunger means to drive the next tack.

4,072,262

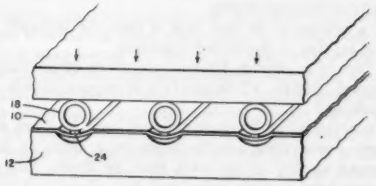
METHOD OF FABRICATING A SOLAR HEATING UNIT

Joseph A. Godrick, Wellesley, and Joseph Leo Sliney, Lexington, both of Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

Filed Apr. 4, 1977, Ser. No. 784,239

Int. Cl.² B21D *39/00*; B23K *31/02*; F24J *3/02*

U.S. Cl. 228—265 **8 Claims**



1. A process of fabricating a solar heating unit for heating fluids comprising the steps of

a. placing a thin, soft, annealed sheet having a good thermal conductivity characteristic in an abutting relation to a grooved surface of a self-supporting, thermally conduc-

tive planar plate, the sheet being between one-eight hard and fully annealed,

b. assembling a plurality of cylindrical elongated hard drawn tubular elements in a spaced apart planar relation, the spacing between said elements equal to the spacing between said grooves, and the contour of said grooves substantially conforming to an attachment portion of the contour of said cylindrical elements,

c. connecting headers in a fluid-tight connection to the assembled elements to provide fluid flow paths between said headers and through said elements,

d. applying a thermally conductive paste adhesive along said attachment portion of the elements,

e. positioning said assembled elements in an aligned relation to the grooves in said plate with said attachment portion abutting said thin sheet, and

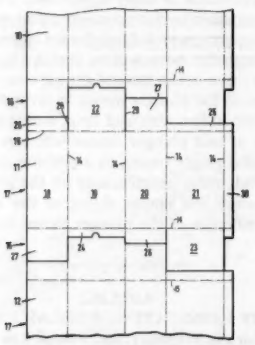
f. pressing said elements against said sheet with sufficient pressure and temperature to creep form said sheet around said attachment portion of said elements, and to simultaneously melt said paste adhesive to thereby provide a good thermally conductive metallurgical bond between the elements and the sheet.

4,072,263

PACK AND BLANK FOR MAKING THE PACK AND WEB OF PACKING MATERIAL FOR MAKING THE BLANKS

Heinz Focke, Verden, Germany, assignor to Focke & Pfuhl, Verden, Germany

Filed Nov. 23, 1976, Ser. No. 744,359
Claims priority, application Germany, Jan. 12, 1976, 2600822
Int. Cl.[2] B65D *5/02*
U.S. Cl. 229—37 R **6 Claims**



1. In an oblong pack for holding contents conforming to the pack configuration, said pack consisting of a folded blank, said pack having opposed sidewalls and end walls, said end walls comprising end flaps folded against the contents end face, the improvement wherein:

at each end, said end flaps are rectangular and at least partially of unequal length,

only a portion of the end flaps of opposite sidewalls cover one another in the folded condition;

end flaps of a common sidewall constitute outer cover flaps for covering the whole end face of respective ends of said pack, and

the corresponding opposed sidewall includes flaps at both ends constituting narrow connecting strips to thereby permit closing of the pack ends by finally folding the cover flaps over the other end flaps about said common sidewall,

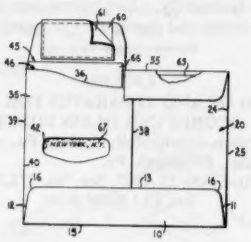
and wherein tooth engagement occurs for the end flaps of said blank with adjacent blanks of a web during blank formation so that the blank may be parted substantially free from waste from a web or the like in forming the pack.

4,072,264

DUPLEX MAILING ENVELOPE

Richard Kranz, Prairie Village, Kans., assignor to Tension Envelope Corporation, Kansas City, Mo.

Filed Mar. 14, 1977, Ser. No. 778,748
Int. Cl.[2] B65D *27/08*
U.S. Cl. 229—72 **7 Claims**



1. In a mailing envelope having a front and a back superimposed panels forming a first pocket adapted for receiving an enclosure therein, said first pocket having side edges and at least one free end defining a mouth providing access thereinto, the improvement of:

(a) a mouth closure flap having an inner edge and an outer edge, said inner edge having connection with said first pocket one free edge along a fold line;

(b) a perforated line extending from said flap inner edge to said flap outer edge, and laterally dividing said closure flap into two mutually separable portions;

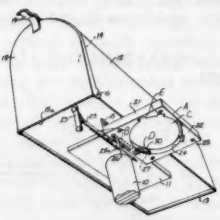
(c) said closure flap portions each having adhesive thereon for sealing contact with one of said panels, only one of said closure flap portions having a release strip covering the adhesive thereon.

4,072,265

SIGNALING DEVICE FOR MAILBOXES

Richard S. Jones, 125 Markboro Drive, Greenville, S.C. 29605

Filed May 6, 1977, Ser. No. 794,381
Int. Cl.[2] A47G *29/12*
U.S. Cl. 232—35 **3 Claims**



1. A signaling device for use with free standing rural mailboxes, having an open-ended mail receiving compartment and a closure therefor pivoted adjacent a lower end thereof adjacent a lower edge of said compartment for downward pivotal movement of said closure exposing said open end for reception of mail when opened by a postman comprising:

a housing carried adjacent a lower intermediate edge portion of said mail receiving compartment;

a plunger slidably carried by said housing spring biased rearwardly toward said closure having an operator normally adjacent a lower edge of said closure but movable forwardly responsive to downward movement of said closure;

a flag normally carried by said housing in retracted position but pivotable downwardly adjacent one edge thereof; and

a catch member carried by said plunger engagable with said flag maintaining the flag in retracted position when said operator is normally positioned adjacent a lower edge of said closure but releasable therefrom when said operator is moved forwardly;

whereby the flag pivots downwardly into signaling position upon opening of said closure by the postman.

4,072,266

CENTRIFUGE, ESPECIALLY FOR THE SUGAR INDUSTRY

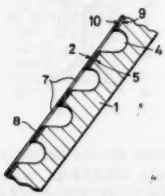
Walter Dietzel, Braunschweig, Germany, assignor to Braunschweigische Maschinenbauanstalt, Braunschweig, Germany

Filed May 27, 1976, Ser. No. 690,536

Claims priority, application Germany, June 19, 1975, 2527227; June 19, 1975, 7519445[U]

Int. Cl.[2] B04B *15/06*

U.S. Cl. 233—2 **14 Claims**



1. In a centrifuge having a rotatable means with liquid flow-off path means on the radially inner surface thereof, and a screen positioned in contact against the radially inner surface of said rotatable means, the improvement comprising a plurality of first roughened surface means on a portion of the radially outwardly facing surface of said screen and a like plurality of second roughened surface means on a corresponding radially inner surface portion of said rotatable means, said first and second roughened surface means contacting each other in a locking manner, thereby providing a frictional resistance under the influence of the centrifugal force, said frictional resistance holding the screen in place substantially uniformly over the entire surface of the screen, whereby relative movement between the screen and the rotatable means is substantially inhibited.

4,072,267

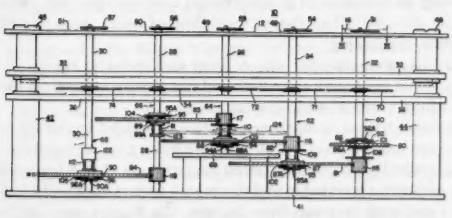
METER ENCODING REGISTER HAVING AN IMPROVED POINTER SHAFT ASSEMBLY

Eugene C. Benbow, Raleigh, N.C., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 23, 1976, Ser. No. 669,547

Int. Cl.[2] G06C *27/00*

U.S. Cl. 235—112 **4 Claims**



1. A plural dial meter encoding register for a utility meter having a rotating metering movement and including plural pointer shaft assemblies each associated with a separate register dial wherein said plural pointer shaft assemblies comprise:

plural shaft members each having a forward end carrying a pointer for an associated register dial;

plural code patterns each carried in a fixed relationship on a separate shaft member in a fixed encoding relationship with a pointer of the same shaft member;

plural input gears each mounted for rotational and axial movements on a separate one of said plural shaft members, and plural output gears fixedly attached to each of said plural shaft members excepting a last one of the shaft members for continuously meshing with said input gears during the rotational and axial movements thereof, said input and output gears rotationally and progressively interconnecting said plural shaft members with said metering movement for concurrently rotating said plural shaft members at different predetermined rates of rotation in response to rotation of said metering movement;

plural clutch members each including a driving portion and a driven portion, each of said driven portions being fixedly mounted to an associated shaft member, each of said driving portions carried on one of said plural input gears, said driving and driven portions having releasably engaging torque transmitting surfaces for coupling and uncoupling rotational movement therebetween when said input gears are axially shifted toward and away from the clutch driven portions respectively, and when the torque on one of the clutch portions is less than and more than a predetermined torque limit, respectively, such that the maximum torque applied from said metering movement during the measuring operation thereof is less than said predetermined torque limit, and further such that an externally applied torque on one of said plural shaft members in excess of said predetermined torque limit effects rotation of the one shaft member and the associated code pattern and pointer independently of any other of said plural shaft members.

4,072,268

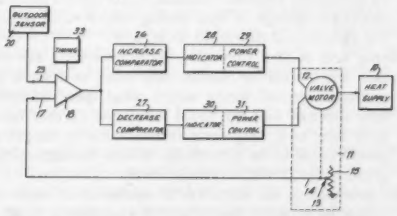
HEATING CONTROL SYSTEM

James Perris, Bloomfield, N.J., assignor to The James Perris Co., Inc., Bloomfield, N.J.

Filed Apr. 14, 1976, Ser. No. 676,789

Int. Cl.[2] G05B *11/06*

U.S. Cl. 236—78 C **15 Claims**



1. A heating control system for automatically controlling the temperature within a space comprising in combination; temperature sensing means for detecting changes in temperature without the space and in response thereto, producing a control signal having a substantially linearly variable potential, the increase or decrease in potential being linearly varied in response to changes in temperature without the space; heat supply means for supplying heat to the space at a set rate including control valve means adapted to be selectively opened to increase the set rate at which heat is supplied to the space and selectively closed to decrease the set rate at which heat is supplied to the space; rheostat means including a movable contact means coupled to said control valve means and disposably controlled thereby to produce a reference feedback signal having a linearly variable potential, said potential being

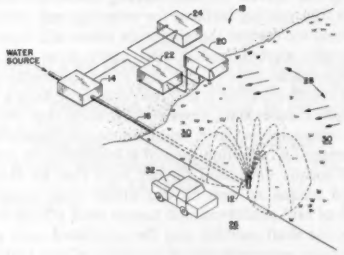
linearly varied in response to the selective opening and closing of said control valve; comparator means for comparing the potential of said variable control signal to the potential of said variable reference feedback signal, said comparator means in response to the potential of said variable control signal being greater than the potential of said variable reference signal being adapted to apply a closing signal to said control valve means to effect decreasing of the rate at which same supplies heat to the space, said comparator means being further adapted in response to the potential of said control signal being less than said reference potential to apply an opening signal to said control valve means to effect an increase in the set rate at which heat is supplied to the space.

4,072,269

INHIBITING SPRAY DISPERSION: METHOD AND APPARATUS

Philip R. Berg, 1028 Century Drive, Napa, Calif. 94558

Filed Aug. 5, 1976, Ser. No. 711,939
Int. Cl.[2] B05B *17/04*
U.S. Cl. 239—1 **12 Claims**



1. A method of regulating the state of wind sensitive means and especially under gusty wind conditions, said means having a first operating state and a second operating state, said method comprising the steps of:

continuously sensing wind speed at a preselected location relative to a preselected wind speed threshold level;

during said first operating state, switching the state of said wind sensitive means only after at least a first minimum period during which wind speed continuously exceeds said threshold level and further inhibiting such state switching for a further variable length period proportional to the percentage of time during which wind speed does not exceed said threshold level; and

during said second operating state, switching the state of said wind sensitive means only after at least a second minimum period during which wind speed continuously falls short of said threshold level, and further inhibiting such state switching for a further variable length period proportional to the percentage of time during which wind speed exceeds said threshold level,

for maximizing the duration of operation in each of said operating states in proportion to variation in wind conditions relative to said wind speed threshold level.

4,072,270

SHOWER HEAD AERATOR

Richard C. Harmony, Tucson, Ariz., assignor to Harmony Emitter Company, Inc., Tucson, Ariz.

Filed Aug. 23, 1976, Ser. No. 716,588
Int. Cl.[2] E03C *1/084*
U.S. Cl. 239—428.5 **4 Claims**

1. A shower head apparatus for mixing ambient air with water flowing from a source of water under pressure, said apparatus comprising in combination:

a. a cylindrically shaped hollow aerator having an internal concentrically located water outlet in fluid communication with the source of water for introducing air into the water flowing through said aerator, said aerator comprising:

i. at least one inlet for receiving ambient air;

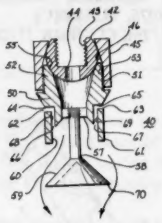
ii. at least one outlet for discharging ambient air into said aerator;

iii. a passageway for interconnecting said inlet and said outlet;

iv. an open ended chamber in communication with each said air outlet and the water outlet for receiving and turbulating both air and water;

v. a further outlet disposed at the downstream open end of said chamber for discharging the water and air flowing into said chamber;

b. cone shaped deflector means for radially deflecting the air and water discharged from said further outlet adjacent the



surface of said cone shaped deflector and developing a converging circular shroud of water and air mixture downstream of said cone shaped deflector means; and

c. a stud extending from a point within said aerator through said chamber to a point downstream of said discharge outlet for supporting the apex of said cone shaped deflector means, said stud being concentrically located with respect to the longitudinal axis of said chamber to position the apex of said cone shaped deflector means at the center of the discharged mixture of air and water;

d. a retainer disposed within said aerator for securing said stud concentric with said aerator;

whereby, the water mixes with the air within said chamber and during subsequent impingement of the flow of water and air discharged from said chamber upon said deflector and is radially distributed along the surface of said cone shaped deflector.

4,072,271

SELF-CLEANING BALL VALVE

Hubert E. Voss, and Ronald W. Roth, both of Picacho, Ariz., assignors to Irrigation Engineering & Specialties, Picacho, Ariz.

Filed Oct. 12, 1972, Ser. No. 296,958
Int. Cl.[2] B05B *1/32*
U.S. Cl. 239—541 **2 Claims**

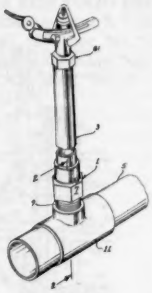
1. In an irrigation pipe system, the improvements operatively associated therewith comprising a riser, a sprinkler head having an aqueduct of predetermined cross section, and a ball valve for controlling the outward flow of water through said system comprising:

a ball valve chamber remote from said sprinkler head;

a throat communicating with and conducting away from the outlet port of said valve chamber;

a valve trigger comprising a hollow tube sized to closely fit the inside of said throat, said tube having at one end longitudinally projecting spaced fingers such that when said trigger is inserted in said throat said fingers engage the ball and push it away from its seat, the fingers and ball in cooperation forming apertures individually smaller in cross section than said aqueduct in said sprinkler head to strain particles larger than said aqueduct, said trigger

having an open end whereby upon being removed from said throat the spaces between said fingers are cleaned by



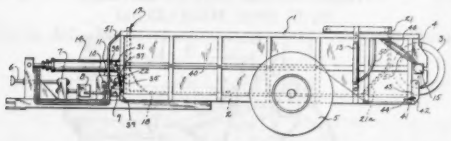
the flow of water therethrough, and means for releasably connecting said trigger in open valve position.

4,072,272

MULTI-PURPOSE SPREADER

Dane Jay Harder, Stratford, Wis., assignor to Harco Products, Inc., Stratford, Wis.

Filed Sept. 3, 1976, Ser. No. 720,354
Int. Cl.[2] A01C *15/16*
U.S. Cl. 239—676 **5 Claims**



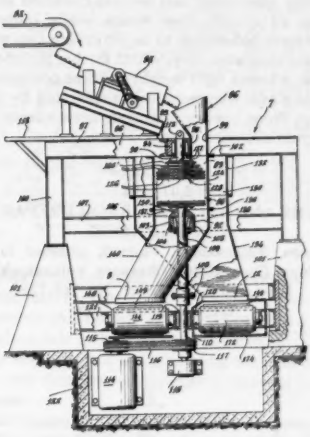
1. A farm material spreader adapted to be mechanically actuated from a power take off of a powered vehicle, which comprises a wagon box having a floor, a frame and confining walls on the front and sides secured to the frame, an upright push gate normally located at the forward end of the wagon box, an end gate pivoted at the rear end of the box to normally seal off the rear end of the spreader, a hydraulic system contained entirely on the spreader including a double acting multistage hydraulic cylinder directly connected to the push gate and adapted to reciprocate the push gate back and forth within the box to move the contents of the box to the rear of the box for discharge therefrom, a second hydraulic cylinder connected to the end gate and adapted to raise and lower the end gate, a beater secured to the box at the rear, a hydraulic motor connected to the beater to rotate the latter, a network of tubing to carry hydraulic fluid to the respective cylinders and to the hydraulic motor, a reservoir for the fluid, a filter, a pump to actuate the fluid, a control valve adapted to control the flow of fluid in the system, and when the pump is set in operation by manual actuation of the control valve and the power take off hydraulic fluid flows through the tubing to supply the fluid to the respective cylinders to automatically actuate the same in a synchronized manner whereby the end gate is pivoted upwardly to a position removed from the push gate when the latter completes its stroke at the rear of the spreader, and the hydraulic motor is simultaneoudly actuated to hydraulically rotate the beater.

4,072,273

PROCESS FOR DRY RECOVERY OF MATERIALS FROM SOLID REFUSE

Haigh McDiarmid Reiniger, Darien, Conn., assignor to Southeast SBIC, Inc., Miami, Fla.

Division of Ser. No. 427,301, Jan. 7, 1974, abandoned, which is a continuation-in-part of Ser. No. 323,147, Jan. 12, 1973, abandoned, which is a continuation of Ser. No. 818,219, April 22, 1969, abandoned. This application Dec. 17, 1976, Ser. No. 752,216
Int. Cl.[2] B02C *23/14*
U.S. Cl. 241—24 **5 Claims**



1. A method for the treatment of solid municipal garbage and trash for making useful products therefrom, including the recovery and restoration of distinct products which are 100 percent recycled from the garbage and trash, said method comprising the steps of:

(A) preparing a feedstock of solid municipal garbage and trash, said feedstock further essentially comprising dried paper, plastic film, glass, ceramics, grit, non-ferrous metals, hard plastics, and cellulosic garbage and plant materials, whereby said solid municipal garbage and trash is comprised of pieces in the range of approximately one-half to six inches in size, wherein further the moisture content is reduced to a range from **20%** to **50%** of the oven-dried basis weight of the solids comprising said feedstock, and

(B) directly inputting said feedstock into an attrition classification machine, wherein said feedstock is separated into two classified streams, as the result of the following steps:

(i) downwardly impelling said feedstock into an attrition classification zone, said zone being defined by the region between a rotor means having a plurality of cutting elements projecting therefrom and a screen means positioned around said rotor means and having a plurality of openings therein, wherein said attrition classification zone applies a severe cutting, abrading, and thrashing action to said feedstock while propelling and intensely scrubbing said feedstock along the inner surface of said screen means, whereby said attrition step loosens and rejects through said screen openings the loose, soft, decayed and disintegratable matter contained in said feedstock, while also performing the step of ballistically driving through said openings the high density particles of glass, ceramics, grit, non-ferrous metal and hard plastics present in said feedstock as a first classified stream while; propelling fibrous constituents through said attrition classification zone, and along the inner surface of said screen, so as to apply a simultaneous severe chopping, cutting, scrubbing, scraping, and

thrashing action upon fibrous constituents of said feedstock, and impelling said fibrous constitutents as machine cleaned confetti thrashed paper, together with any chopped plastic film and light weight particles not passing through the openings of said screen, downwardly as a second classified stream; and

(C) directly conveying said first classified stream to an air classification means, while subjecting said first classified stream to an air drying step previous to a gravity separation step which further includes a forced air flow, wherein said first classified stream is thereby separated into lighter fractions of fiberized fuel, carried off by said forced air flow, and heavier fractions of aggregate materials and;

(D) directly conveying said second classified stream to a separate air classification means, while subjecting said second classified stream to an air drying step previous to a ballistic separation step, which further includes a forced air flow, wherein light weight airborne confetti paper and airborne plastic film particles are separated, by said forced air flow, from heavier aggregate constituents present in the second classified stream.

4,072,274

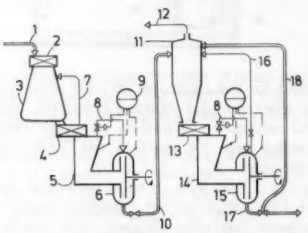
PROCEDURE AND APPARATUS FOR PREPARING HOT GROUNDWOOD

Ahti Syrjanen, Valkeakoski, Finland, assignor to Yhtyneet Paperitehtaat Osakeyhtio Jylhavaara, Valkeakoski, Finland

Filed Feb. 8, 1977, Ser. No. 766,776

Int. Cl.[2] B27L *11/08*

U.S. Cl. 241—28 **5 Claims**



1. In a process for preparing hot groundwood from wood chips, wherein a chip stream is conducted into a pressurized steaming chamber, where the chips stay a few minutes and are heated to a temperature higher than 100° C, and from the steaming chamber is conducted through a sluice feeder into a hot stage I grinder of enclosed construction, whence the pre-ground groundwood is conducted through a separating cyclone into a stage II grinder, and the groundwood from the stage II grinder is conducted towards further treatment steps, the improvement which comprises the step of conducting the pre-ground groundwood from the steam separating cyclone through a sluice feeder into a hot stage II grinder of enclosed construction and conducting steam generated by the stage II grinder into the steam separating cyclone.

4,072,275

SAMPLE PREPARATION DEVICE

Hermann Bartels, Binningen; Werner Schürmann, Greifensee, and Max Sigg, Weisslingen, all of Switzerland, assignors to Mettler Instruments AG, Greifensee, Switzerland

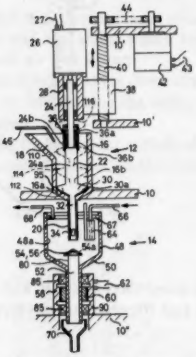
Filed Oct. 18, 1976, Ser. No. 732,915

Claims priority, application Switzerland, Dec. 5, 1975, 15839/75

Int. Cl.[2] B02C *23/36*

U.S. Cl. 241—79 **7 Claims**

1. A sample preparation device comprising a wet mill having a lower discharge opening for discharging crushed wet material from the mill, a continuous flow centrifuge arranged at a lower level than the mill, flow means providing a direct communication between said discharge opening and said centrifuge for the direct transfer of the crushed wet material from the mill into the centrifuge, mill drive means, the mill including a mill casing internally provided with a one-piece crushing member



which comprises an upper end portion connected to said mill drive means, a substantially frusto-conical crushing portion, and a lower shaft end portion which is substantially sealingly displaceable in said discharge pipe, and drive means for vertical displacement of the crushing member in said mill casing.

4,072,276

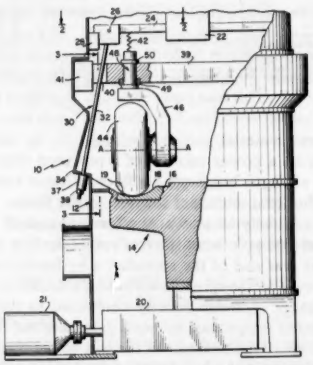
PULVERIZER WITH CASTER ROLLER ASSEMBLY

Chester J. Romanowski, Carteret, N.J., assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Filed Apr. 7, 1977, Ser. No. 785,394

Int. Cl.[2] B02C *15/04*

U.S. Cl. 241—117 **8 Claims**



1. Apparatus for pulverizing material including hard material into comminuted particles comprising a housing, a rotatable table mounted within said housing, a grinding ring mounted on said table and defining a circumferential path on said table, means for rotating said table, means for introducing said material into said housing in contact with said grinding ring, at least three rollers disposed in said housing, means for mounting said rollers in said housing for rotation about respective axes of rotation, said mounting means including a supporting ring disposed above said roller, a plurality of brackets, each of said rollers being mounted on a respective one of said brackets, and a plurality of shafts, each one of said shafts being connected between said ring and a respective one of said brackets and defining a swivel axis lying forward of the axis of rotation of its respective roller, and means for absorbing a shock load applied to said roller disposed between said brack-

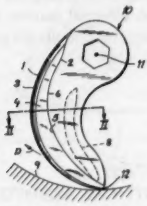
ets and said mounting ring and adapted to allow said rollers to move about said respective swivel axes.

4,072,277

CUTTER BLADE FOR FOOD PROCESSING

Ludwig Seydelmann, Holderlinstrasse 9, 7 Stuttgart 1, Germany

Filed Oct. 22, 1976, Ser. No. 735,007
Claims priority, application Germany, Nov. 25, 1975, 2552723
Int. Cl.[2] B02C *18/20*
U.S. Cl. 241—292.1 8 Claims



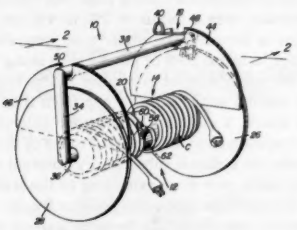
1. A blade for chopping foodstuffs and the like when set in rotation about an axis, comprising a generally flat body with two major surfaces substantially transverse to said axis meeting in a continuous cutting edge leading in the direction of rotation, one of said major surfaces having a marginal zone bounded by said cutting edge, said marginal zone sloping away from the plane of rotation of said cutting edge and merging into at least one flattened land substantially paralleling said plane of rotation, said flattened land terminating at a step rising from said land and forming an ancillary edge inwardly of said cutting edge facing in said direction of rotation.

4,072,278

DROP CORD REEL

Leo D. Petersen, 515 S. Grant Ave., Pocatello, Idaho 83201

Filed Nov. 19, 1976, Ser. No. 743,407
Int. Cl.[2] B65H *75/40, 75/28*
U.S. Cl. 242—96 5 Claims



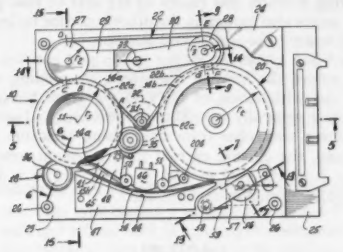
1. A cord reel, comprising, in combination:
a. spool means including a substantially U-shaped framework, and a spool rotatably mounted on the framework for winding and unwinding a cord; and
b. rotating means connected to the spool means for rotating the spool, the spool having a pair of spaced ends and a winding surface terminating in and extending between the ends of the spool, a plate mounted on the spool at one of the ends of the spool, and the rotating means including a knob mounted on the plate, the spool having an axis of rotation and the knob being spaced from the axis of rotation so that the plate and knob form a crank for rotating the spool, the spool means further including a further plate similar to the plate on which the knob is mounted and attached to the spool at the other of the ends of the spool, the winding surface, plate and further plate forming an open winding drum, the spool means still further including guides overlapping the plate and further plate and attached to the framework for preventing the cord wound on the winding surface of the spool from rolling over the plates.

4,072,279

BELT DRIVE FOR TAPE TRANSPORT, WITH FLOATING ROTOR DRIVE PRESSURE APPLICATION

Richard A. Lewis, Sherman Oaks, Calif., assignor to Interdyne Company, Van Nuys, Calif.

Filed Apr. 26, 1976, Ser. No. 680,195
Int. Cl.[2] G11B *15/32, 15/66*
U.S. Cl. 242—192 16 Claims



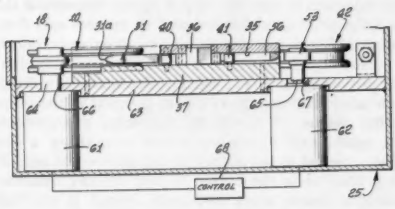
11. In a tape transport assembly, the combination comprising
a. a pair of reels for tape to be transported from a supply roll on one reel to a take-up roll on the other reel,
b. an endless belt located to arcuately engage the tape rolls on the respective reels for rotating the rolls and reels to effect said transport in response to endwise travel of the belt, and
c. support means for the reels and belt, said support means including a frame and belt rollers entraining the belt, the reels supported to freely rotate,
d. said support means including a first arm supporting one belt roller to swing in an arc tending to maintain arcuate engagement of a first section of the belt with the tape roll on one reel during said tape transport,
e. and said support means including a second arm supporting another belt roller to swing in an arc tending to maintain arcuate engagement of a second section of the belt with the tape roll on the other reel during said tape transport,
f. the belt contacting the tape only at said rolls,
g. said belt rollers located to squeeze the belt between said one belt roller and the tape roll on said one reel, and between said other belt roller and the tape roll on said other reel.

4,072,280

TAPE AND/OR FILM HANDLING MECHANISM

Richard A. Lewis, Sherman Oaks, Calif., assignor to Interdyne Company, Van Nuys, Calif.

Continuation of Ser. No. 563,292, March 31, 1975, abandoned.
This application Apr. 29, 1976, Ser. No. 681,467
Int. Cl.[2] G03B *1/04;* G11B *15/32*
U.S. Cl. 242—195 32 Claims



9. In a tape storage unit, the combination comprising

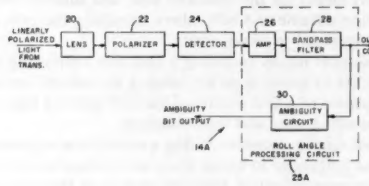
a. a reel having an axis, spaced flanges extending normal to said axis, and a hub about which tape is wound for storage between the flanges,
b. a leader strip connected with the tape, the width of the leader strip being greater than the tape width,
c. the flanges retaining the opposite edges of the leader strip so that the tape becomes protectively confined by the flanges and leader strip,
d. there being multiple rotors at least two of which are in peripheral engagement with said flanges and positioning the reel for rotation,
e. means mounting another of the rotors for movement away from the reel to enable bodily removal of the reel from rotating position and return of the reel to said position, said means also mounting the other rotor for return movement toward the reel in said position,
f. there being a housing for the reel in said position and for said rotors, the housing containing an opening enabling pull out withdrawal of the reel from the housing in a direction generally normal to the reel axis, and said means mounting said other rotor comprising a closure for said opening, the closure carried for movement toward and away from the reel in said position, and in a direction generally normal to the reel axis.

4,072,281

OPTICAL ATTITUDE REFERENCE

Walter E. Miller, Jr., Huntsville; Robert L. Sitton, Tuscumbia, and Anthony D. Blackmon, Huntsville, all of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 27, 1976, Ser. No. 754,204
Int. Cl.[2] F42B *15/02*
U.S. Cl. 244—3.16 **7 Claims**



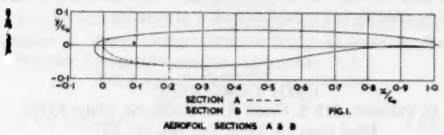
1. Apparatus for providing optical attitude reference for a missile comprising: transmitter means for directing optical energy from a fixed station toward said missile; optical detector means on said missile responsive to optical energy from said transmitter for providing electrical output signals; a prism disposed on said missile adjacent said optical detector means and between said optical detector and said transmitter, said prism having an ordinary ray output and an extraordinary ray output, said prism being disposed for polarizing optical energy from said transmitter prior to said energy being received by said optical detector; said optical detector means comprises first and second detectors disposed to receive said ordinary and extraordinary prism outputs respectively and provide an electronic output signal responsive thereto; first and second amplifiers disposed respectively to receive inputs from said first and second detectors to provide output signals responsive thereto and a differential amplifier coupled to receive said first and second amplifier output signals for providing an output signal; filter means disposed to receive the differential amplifier output for providing an output signal for coupling to indicator or load circuitry; and ambiguity means coupled to the output of said filter means for selectively providing a predetermined output signal; said ambiguity means comprising a limiting amplifier coupled to the output of said differential amplifier, a flip-flop coupled to the output of said limiting amplifier for providing a square wave frequency output at one-half the frequency output of said limiting amplifier, said flip-flop having both an inverted and a non-inverted output; first and second signal channels having inputs coupled respectively to said flip-flop outputs; an OR gate having first and second inputs and an output, said OR gate being coupled to receive output signals from said first and second channels and provide an output signal when said predetermined flip-flop output is present on either channel; each of said channels comprising, in series, a first AND gate, a low pass filter, a comparator, a latching circuit, and a second AND gate, said first AND gate being coupled to respective outputs of said flip-flop and said second AND gate being coupled to provide an input to said OR gate; each of said first AND gates being adapted to receive a reference signal input from an external source; and inhibit means coupled to each of said latching circuits for preventing simultaneous operation of said latches.

4,072,282

SUPERCRITICAL AEROFOILS

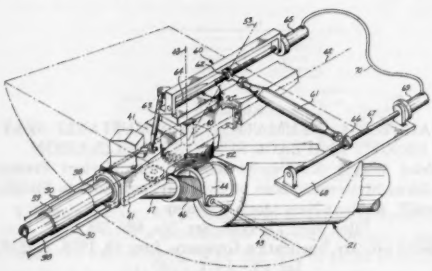
John Leslie Fulker, Bedford; David John Hall, Stevenage, and Robert Christopher Lock, West Byfleet, all of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Mar. 4, 1976, Ser. No. 663,903
Claims priority, application United Kingdom, Mar. 4, 1975, 9017/75
Int. Cl.[2] B64C *3/14*
U.S. Cl. 244—35 R **3 Claims**



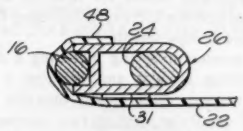
1. A supercritical aerofoil having a leading edge, an upper and a lower surface and a trailing edge and wherein the leading edge is circular with a radius of 2% to 4% chord, the upper surface has a forward transition zone extending from said leading edge to about 20% of the distance along the chord and wherein the upper surface curvature radius increases rapidly from said leading edge radius to one from about 3 to about 5 times the chord, a constant radius zone extending from said forward transition zone for about 0.5 to 0.8 of the chord length and wherein the radius is substantially constant at 3 to 5 times the chord, and a rear zone extending to the trailing edge and wherein the curvature decreases rearwardly; the lower surface has a forward zone extending from the leading edge to a point not less than about 40% and not more than about 55% of the chord the radius of curvature whereof is at least equal to the chord but smaller than said upper surface constant radius zone radius, a curvature transition zone extending from said forward zone to between 55% and 70% of the chord, and a rearward zone extending from the transition zone to about the trailing edge and which is concave and has a mean radius of about equal to the chord, whereby a rear part of the aerofoil is effectively cambered; and said leading edge being a drooped leading edge, and the aerofoil having a thickness/chord ratio of 10% to 14%; whereby in use at supercritical speeds air passing over the upper surface is rapidly accelerated over the leading edge and forward zone to a supersonic speed and decelerated sufficiently before the trailing edge to permit the effective camber of the rear part of the aerofoil to augment the lift and without generating a shock wave sufficiently strong to cause a significant increase in drag, and in use at low speeds sufficient lift is generated for take off and landing on normal length runways.

4,072,283
AERIAL REFUELING BOOM ARTICULATION
Richard Herschel Weiland, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.
Filed Dec. 17, 1976, Ser. No. 751,553
Int. Cl.[2] B64D *39/00*
U.S. Cl. 244—135 A 13 Claims



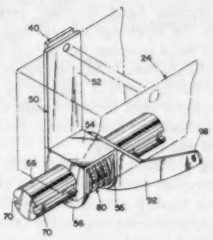
1. Apparatus for attaching a boom to a supply airplane for the aerial transfer of material to a receiver airplane, comprising: a boom housing mounted to support structure of the supply airplane for rotation about a roll axis approximately parallel to the longitudinal axis of the supply airplane; a spindle supported in said housing for rotation about a vertical axis approximately parallel to the yaw axis of the supply airplane; said spindle connectably supporting the boom for rotation about an axis of elevation relative to the receiver airplane, said elevation axis being approximately transverse to the longitudinal axis of the supply airplane; and means interconnected between said spindle and fixed structure of the supply airplane for kinematically producing a geometrically canted azimuth axis which provides a certain amount of boom motion about said roll axis with sideward movement of the boom.

4,072,284
KITE BRACKET
Bennett Arnstein, 3049 W. 8th St., Los Angeles, Calif. 90005
Filed Dec. 27, 1976, Ser. No. 754,111
Int. Cl.[2] B64C *31/06*
U.S. Cl. 244—153 R 1 Claim



1. I claim a kite structure containing but not limited to the following elements: a main body portion formed from a thin flexible material with two leading edges diverging rearwardly; two wing struts attached to the main body, one adjacent to each leading edge; two brackets attached to the main body, one adjacent to each wing strut; each bracket being a monolithic structure whose shape is the combination of an open channel and a triangular pocket, the side walls of the channel being extended to form the side walls of the triangular pocket which meet and join to form the inboard boundary of the triangular pocket, the base of the channel forming the outboard boundary of the triangular pocket; attaching means for securing said main body to the side wall of said bracket; and further attaching means for holding said leading edge in a folded position over said wing strut whereby said wing strut is nonrigidly held in said open channel.

4,072,285
DUMPABLE RAIN GUTTER SYSTEM
Edward L. Greenwood, 3721 S. Queensgrove Circle, Virginia Beach, Va. 23452
Filed Sept. 1, 1976, Ser. No. 719,401
Int. Cl.[2] E04D *13/06*
U.S. Cl. 248—48.2 12 Claims



1. A dumpable rain gutter support for normally supporting a rain gutter of the type having a vertical rear wall, a horizontal bottom wall and a front wall in an upright position and allowing the rain gutter to turn downward to be cleaned, comprising:

a mounting bracket adapted to be secured to the facia or trim board of a building;

a gutter bracket adapted to be secured to the gutter, said gutter bracket including a vertical portion located behind and secured to the rear wall of the gutter and a horizontal ledge disposed beneath the gutter to support the bottom wall thereof;

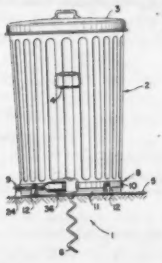
a first pair of spaced vertical flanges on said mounting bracket, each flange being provided with an opening in horizontal alignment with the opening in the other flange;

a second pair of spaced vertical flanges extending downward from said horizontal ledge of said gutter bracket, each flange being provided with an opening in horizontal alignment with the opening in the other flange;

a pivot rod received in the openings of said first and second flanges for pivotally connecting said mounting bracket and said gutter bracket together; and

resilient bias means for normally maintaining said gutter bracket upright and allowing said gutter bracket to pivot downward to permit the gutter to be cleaned.

4,072,286
GARBAGE CAN SUPPORT
William S. Foncannon, P.O. Box 123, Mullinville, Kans. 67109
Continuation-in-part of Ser. No. 622,772, Oct. 15, 1975, abandoned. This application Sept. 17, 1976, Ser. No. 724,737
Int. Cl.[2] A47G *23/02*
U.S. Cl. 248—154 3 Claims



1. A garbage can support comprising:

a. a generally horizontally disposed base having a plurality

of radially extending, substantially flat arms with circumferentially spaced outer ends;

b. a plurality of clips each having a base and an upstanding leg attached thereto; each of said clip bases being elongate, and having a downwardly disposed C-shaped channel wherein a different one of said arms is positioned for sliding, longitudinal translation thereon; each of said clip legs having a transverse opening therethrough;

c. a normally arcuate band member positioned slidably within each of the openings of said legs for connection therewith; said band member being supported above said arms by said clips whereby said elongate clip base resists twisting from forces applied thereto by said band; said band having spaced ends between adjacent arms;

d. a quick release locking mechanism operably connecting said band ends and including:

1. a toggle arm pivotally connected with one end of said band and disposed for operation in a horizontal plane;
2. a first sleeve having a transversely disposed aperture therethrough and being separably connected with the other end of said band;
3. a link member having a first portion thereof positioned within said sleeve aperture and being pivotally connected with said first sleeve; a second portion of said link member being pivotally connected with said toggle arm whereby selected rotation of said toggle arm causes the ends of said band to converge to a closed position, wherein said clips and said band are clamped abuttingly about a lower portion of said container and said toggle arm engages a portion of said band to maintain said closed position; and

e. means separably connecting said first sleeve with said band other end at circumferentially spaced positions thereon to accomodate variously sized containers, and including:

1. a plurality of radially disposed and circumferentially spaced apertures through said band and positioned adjacent to said other end thereof; and
2. a rod attached radially to said first sleeve and disposed within one of said band apertures, said rod having a threaded free end and a nut engaged therewith for separably connecting said band and first sleeve.

4,072,287

SEAT SUPPORTING ASSEMBLY OF THE RESILIENTLY LOADED TYPE

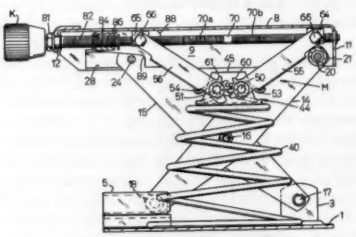
Richard F. Swenson, Milwaukee; Shawn H. Eimen, Wauwatosa, and John J. Gryga, Jr., Milwaukee, all of Wis., assignors to Milsco Manufacturing Company, Milwaukee, Wis.

Filed Jan. 19, 1977, Ser. No. 760,534

The portion of the term of this patent subsequent to June 14, 1994, has been disclaimed.

Int. Cl.[2] F16M *13/00*

U.S. Cl. 248—399 **10 Claims**



1. A seat supporting assembly comprising a lower base member, an upper seat platform for supporting a seat, linkage means connected between said base and said platform for vertically positioning the platform relative to the base, a spring mounted on the base and extending upwardly therefrom, a spring loaded mechanism mounted on the upper end of said spring and pivotally secured to said upper seat platform, mechanism for adjusting said spring loaded mechanism to raise and lower said platform relative to said base, an upstop limit for limiting the upward movement of said platform, said adjusting mechanism also having an actuator for selectively operating said up-stop limit or said adjusting mechanism.

4,072,288

CHAIR WITH PNEUMATICALLY ADJUSTABLE SEAT HEIGHT AND BACK SUPPORT INCLINATION

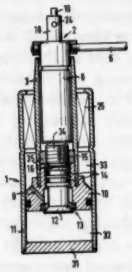
Winfried Wirges, Koblenz-Moselweiss, and Herbert Freitag, Koblenz-Metternich, both of Germany, assignors to Stabilus GmbH, Koblenz-Neuendorf, Germany

Filed May 17, 1976, Ser. No. 686,738

Claims priority, application Germany, June 10, 1975, 2525752

Int. Cl.[2] A47C *7/40*

U.S. Cl. 248—404 **17 Claims**



1. A pneumatic spring assembly comprising:

a. a first pneumatic spring including a first cylinder portion having an axis and defining a first cavity therein, a first piston axially movable in said cavity and axially separating two compartments of said cavity, a first piston rod portion secured to said piston for joint axial movement and axially projecting from said cavity, a gas under a pressure higher than atmospheric pressure filling said compartments, first valve means connecting said compartments, and first manually operable means for opening and closing said valve means and for thereby controlling flow of said gas between said compartments;

b. a second pneumatic spring including a second cylinder portion having an axis and defining a second cavity therein, a second piston axially movable in said second cavity and axially separating two compartments of said second cavity, a second piston rod portion secured to said second piston for joint axial movement and axially projecting from said second cavity, a gas under a pressure higher than atmospheric pressure filling said compartments of said second cavity, second valve means connecting said compartments of said second cavity for controlling flow of said gas therebetween, and second manually operable means for opening and closing said second valve means while said first valve means are open and while said first valve means are closed,

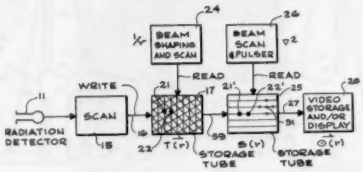
1. one of said portions of said second pneumatic spring being received in one of said portions of said first pneumatic spring; and

c. securing means connecting said one portion of said second pneumatic spring to said one portion of said first pneumatic spring and limiting relative axial movement of the connected portions.

4,072,289
AXIAL TOMOGRAPHY

Keith A. Brueckner, La Jolla, and John H. Lewis, Los Angeles, both of Calif., assignors to Xonics, Inc., Van Nuys, Calif.

Filed Sept. 10, 1976, Ser. No. 722,202
Int. Cl.[2] G03B 41/16
U.S. Cl. 250—445 T 33 Claims



1. In an apparatus for producing an axial tomographic image of an object, with a detector for receiving radiation along a plurality of sets of paths, with said sets of paths overlapping each other, providing a plurality of sets of radiation detector output signals, the improvement including in combination:

first means for storing said detector output signals in analog form at a surface with signals of one set overlying signals of another set whereby the signals resulting from radiation through a zone of the object are summed at a corresponding zone at said surface producing a first stored signal;

first means for reading said first stored signal, including means for scanning across said surface and means for producing second signals, with a second signal for a scan point being a function of the magnitude of the first stored signal at the scan point and varying substantially inversely proportional to distance from the scan point;

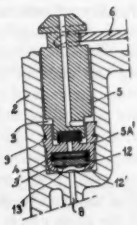
second means for storing said second signals producing second stored signals; and

second means for reading said second stored signals at each of a plurality of points of said second storage means and including means for producing a video signal for each point, with a video signal being substantially the Laplacian of the second stored signal for the point, and with the video signal corresponding to the desired image.

4,072,290
VALVE FOR DISPOSABLE GAS LIGHTER

Guy Neyret, Francheville, France, assignor to Etablissements Genoud & Cie, Venissieux, France

Filed Sept. 8, 1975, Ser. No. 611,264
Claims priority, application France, Sept. 10, 1974, 74 31436
Int. Cl.[2] F23D 13/04; F16K 47/08
U.S. Cl. 251—127 2 Claims



1. A valve for a lighter having a reservoir for a compressible fluid, comprising:

a housing formed with an upright well, a gas outlet communicating with said reservoir and opening into said well at the bottom thereof, and a shoulder surrounding said outlet at said bottom of said well;

a compressible unapertured diffuser filter disk member of porous material in line with said outlet; a support washer for said disk member;

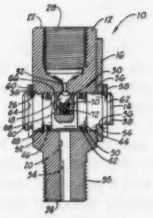
a valve seat member force-fittedly received in said well and having a pair of opposite sides while being formed with a passage extending between said sides, one of said sides bearing against and compressing said disk member whereby fluid exiting from said reservoir through said outlet enters said passage only upon diffusion through said disk member, one of said members bearing against said shoulder; and

a valve body sealingly engageable over said passage at the other side of said seat member, said seat member having a cavity and being provided with a central boss at said other side, said body extending into the cavity of said plug and bearing against said boss, said plug and said well being cylindrical and said plug having outwardly directed ridges engaging a wall of said well, said one side of said seat member being formed with an extension forming a second cavity which opens toward said shoulder, said extension including gripping edges which are directed transversely for retaining said disk and washer within said second cavity.

4,072,291
ROTARY VALVE WITH SPRING BIASED VALVE MEMBER

Ladd M. Adams, Norman, Okla., assignor to Entek Corporation, Norman, Okla.

Filed Aug. 22, 1975, Ser. No. 606,865
Int. Cl.[2] F16K 5/06, 15/04
U.S. Cl. 251—181 10 Claims



1. A valve comprising:

a valve body;

a flow passage formed in said valve body;

a cylindrical bore of uniform diameter through its full length extending entirely through said valve body and transversely intersecting said flow passage;

cylindrical valve stem means journaled in said cylindrical bore and having a transverse cavity formed therein aligned normal to the axis of rotation of said valve stem means, and further having a reduced diameter portion disposed centrally on said stem means adjacent said cavity for communicating portions of said flow passage located on opposite sides of said bore with each other when said valve is open;

seal means mutually engaging said valve stem means and said bore for providing fluid-tight communication between said cylindrical bore and said flow passage at the intersection therebetween;

valve seat means disposed in said valve body along at least one line of intersection between said flow passage and said bore;

spherical valve member means in the form of a sphere having an uninterrupted spherical external surface and slidably and rotatably partially received in the cavity in said valve stem means and adapted for rotative motion about an infinite number of axes of rotation relative to said valve stem means for engaging said valve seat means with a portion of its spherical external surface to close said flow

passage and, alternately, disengaging from said valve seat means to open said flow passage;

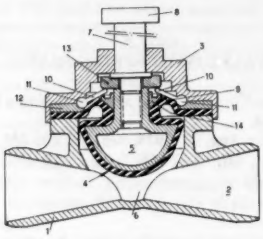
biasing means in said cavity and operatively engaging said valve stem means and said valve member means for urging said valve member means radially outwardly relative to said valve stem means; and

operator means engaged with said valve stem means for moving said valve stem means and said valve member means relative to said valve seat means and said valve body into a position closing said flow passage and, alternately, into a position opening said flow passage.

4,072,292
DIAPHRAGM VALVE

Gabriel J. C. Banon, Paris, France, assignor to Societe Industrielle d'Etudes et de Realisations Scientifiques S.I.E.R.S., Paris, France

Filed Apr. 20, 1976, Ser. No. 678,552
Claims priority, application France, Apr. 29, 1975, 75 13372
Int. Cl.[2] F16K *7/12*
U.S. Cl. 251—331 **2 Claims**



1. A diaphragm valve of the type, comprising:

a valve body with a fluid passage defined therethrough;

a flexible diaphragm clamped at its periphery between said body and a cover;

a movable knob, of suitable configuration and integral with a valve stem mounted so as to be slidable axially within said cover, for displacing said diaphragm between a position opening and a position closing the fluid passage; and

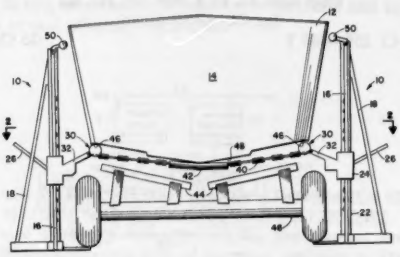
a plurality of radially disposed movable members arranged ina side-by-side manner above an annular portion of said diaphragm concentrically disposed about said valve stem, each of said members being pivotably mounted at one of the ends thereof upon said cover while the other ends thereof are held upon said valve stem between an upper stop integral with said stem and a lower stop freely slidable upon said stem in such a way as to form, along the radial extent thereof, a substantially continuous, movable supporting surface for said diaphragm annulus and to provide rigid support for said diaphragm annulus on the cover side thereof so as to preclude stretching thereof under pressure of the fluid in said fluid passage.

4,072,293
BOAT JACKS

Boyd Sadler, 3400 Browning Street, Victoria, British Columbia, Canada (V8P 4E1)

Filed Feb. 28, 1977, Ser. No. 772,583
Int. Cl.[2] B66F *7/12*
U.S. Cl. 254—89 R **5 Claims**

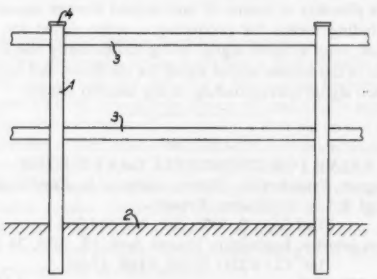
1. In a boat jack system involving boat jacks operable in laterally opposing pairs to lift a boat onto or off a carrier therefor, each boat jack including a tripod support, a center pole containing a vertically movable jack component and a manually operable cranking arm for moving said jack component, the improvement which comprises providing a T-shaped base for said tripod support, the top of the "T" facing the front of said jack, a horizontal tubular lifting member being mounted to a lifting bar therefor, said lifting bar mounted in turn to said movable jack component, an elongated chain detachably mountable to and between each said horizontal lifting member and lifting bar, intermediate the ends of said chain in a generally central position there being mounted a support tube, said elongated chain providing simultaneous lifting support to said jacks and prevention of their lateral movement when liftingly engaged with said boat.



4,072,294
TUBULAR FENCE

Karl Thure Densen, 24, rue de Geneve, - 01210 Ferney-Voltaire, France

Filed Apr. 17, 1975, Ser. No. 568,817
Claims priority, application Switzerland, May 2, 1974, 5974/74
Int. Cl.[2] E04H *17/16*
U.S. Cl. 256—24 **3 Claims**



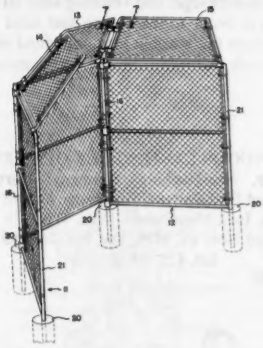
1. A fence construction kit comprising, a plurality of individual tubular posts, a plurality of tubular cross-pieces each of generally uniform cross-section along its entire length and all having alike first and second ends, means defining apertures in the posts for receiving the ends of cross-pieces extending therein and for supporting the ends of the cross-pieces on the posts when the posts are upstanding and with the cross-pieces disposed transverse to the posts while allowing a relative movement of the cross-pieces and posts along an axial direction of the cross-pieces, said posts having upstanding tabs adjacent the periphery of said apertures, means defining in an end portion of each of the cross-pieces a plurality of recesses spaced-apart from one another along an axial direction of the cross-piece, said recesses of each end of a cross-piece being receptive of said tabs to selectively and releasably position cross-pieces axially relative to a post in any one of a plurality of discrete axial positions defined by said recesses, and locking means cooperative with the posts and the ends of the cross-pieces for releasably securing the cross-pieces in any one of said discrete axial positions relative to the posts.

4,072,295

FOLDABLE BACKSTOP AND LIKE STRUCTURE

Darrel V. Roberts, 13455 Fort St., Draper, Utah 84020

Filed Mar. 1, 1976, Ser. No. 662,543
Int. Cl.[2] E04H 17/16
U.S. Cl. 256—26 5 Claims



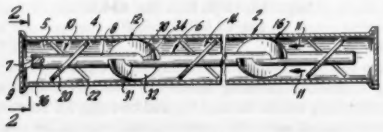
1. A factory-fabricated baseball backstop or like structure constructed to fold compactly for transportation to an erection site, comprising a plurality of side-by-side, laterally adjoining and hinged panel sections, each having a frame made up of steel tubing as upstanding post and transverse frame members, and having steel chain link fence fabric covering the frame; hinges in the form of relatively short sleeves of steel tubing rigidly secured in mutually spaced relationship to respective transverse frame members of one of mutually adjoining sections and freely encircling a post frame member of the other said mutually adjoining sections as a hinge sleeve, said post constituting the hinge pintle; means attaching one side of the chain link fence fabric of said one section to a post frame member of that section; means attaching the other side of the chain link fence fabric of said one section to the hinge-sleeve-encircled, post frame member of said other of the mutually adjoining sections, the chain link fence fabric of said one section being stretched taut between the post frame members to which it is attached; and means for preventing hinging action of the hinges following erection of the structure, whereby, in the erected structure, adjoining panel sections have a single post in common which is a part of only one of said adjoining panel sections, mutually adjacent lateral margins of the fence fabric of the respective adjoining panel sections being attached to the common post under stretching stress.

4,072,296

MOTIONLESS MIXER

Lewis G. Doom, 95 Meadow Farm Road, East Islip, N.Y. 11730

Continuation of Ser. No. 596,249, July 16, 1975, abandoned.
This application Oct. 12, 1976, Ser. No. 731,775
Int. Cl.[2] B01F 15/00
U.S. Cl. 366—337 2 Claims



1. A motionless mixer includes

a substantially cylindrical conduit defining a channel having a central axis;

an elongated member disposed longitudinally within said channel along said central axis, said elongated member having a transverse end surface and a slot-like aperture extending into and across said end surface;

a plurality of baffle means attached to said elongated member at spaced longitudinal points; and

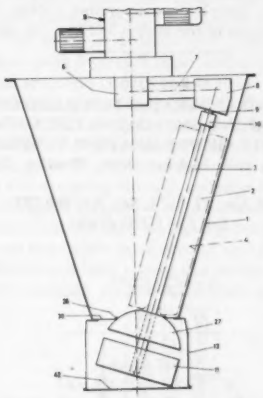
a cross member of a first cross sectional area having two ends which ends are attached respectively to two opposed sides of said channel, so that said cross member extends transversely across said channel, said cross member including at least one longitudinal portion having a smaller cross sectional area than said first cross sectional area which portion intersects said central axis and is adapted to cooperate with said slot-like aperture in said one end surface of said elongated member.

4,072,297

CONICAL MIXING APPARATUS HAVING SUPPORT STRUCTURE FOR THE MIXING SCREW PROVIDED BELOW THE BOTTOM OF THE MIXING VESSEL

Jan Willem de Vries, Vincent van Goghstraat 69, Zelhem, Netherlands

Filed Jan. 12, 1977, Ser. No. 758,826
Claims priority, application Netherlands, Jan. 21, 1976, 7600638
Int. Cl.[2] B01F 7/08
U.S. Cl. 366—287 9 Claims



1. Mixing apparatus comprising at least one mixing vessel mounted on a supporting housing, said mixing vessel having a side wall, a bottom wall having a central aperture and a vertical axis, a mixing screw located in said vessel having a central shaft connected to a dirve and support mechanism at its upper end for simultaneously rotating said screw around the axis of its shaft and revolving said screw around the axis of the vessel, the lower end of the mixing screw shaft extending through said aperture and being supported below said vessel in a bearing located in said housing, said bearing comprising a universal joint as well as radial and axial force receiving bearings, said universal joint having a first tiltable member supported by means of pivot pins extending from said housing and a second tiltable member supported by means of pivot pins extending from said first tiltable member, the radial and axial force receiving bearings being mounted in a bearing support in said second tiltable member perpendicular to the pins thereof, a cover secured over said bearing support and around the mixing screw shaft extending through the aperture in the bottom of the mixing vessel, said cover having its upper surface shaped as a segment of a sphere around the centre of the universal joint and means for sealing the spherical surface of the cover with respect to the aperture in the bottom wall of said mixing vessel.

4,072,298

METHOD OF COOLING A QUENCHING BATH OF MELTED SALT

Berthold Kranz, Duren, Germany, assignor to Firma Carl Canzler, Duren, Germany

Filed July 7, 1975, Ser. No. 593,256
Claims priority, application Germany, July 12, 1974, 2433539
Int. Cl.[2] G05D *23/13*
U.S. Cl. 266—44 **5 Claims**

1. A method of cooling a treatment bath of melted salt into which heat is being introduced by the work or substance which is being treated therein, as when hot workpieces are quenched, for example, the salt bath cooling method comprising the steps of:

using a primary cooling medium a liquid whose boiling point lies substantially below the operating temperature of the salt bath;

heating said liquid primary cooling medium to a state of partial evaporation, so as to create a mixture of liquid and vapor;

introducing said liquid and vapor mixture into the salt bath, in direct contact therewith, thereby

evaporating the remaining liquid portion of the cooling medium through direct heat transfer from the melted salt to the cooling medium, with the previously evaporated portion of said cooling medium acting as an atomizing agent on the liquid portion of the cooling medium, thus controlling its expansion during evaporation; and

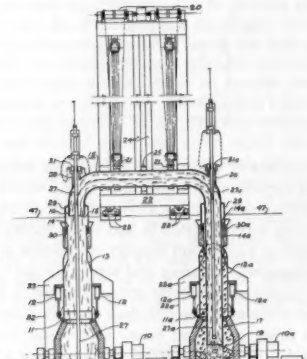
agitating the treatment bath by utilizing the expansion forces acting on the completely evaporating cooling medium to entrain a portion of the melted salt in a circulatory flow.

4,072,299

METHOD AND APPARATUS FOR BASIC OXYGEN STEEL MAKING EMPLOYING THE OFF-GAS PRINCIPLE OF PRE-HEATING PURPOSES

Albert Calderon, 1065 Melrose Drive, Bowling Green, Ohio 43402

Filed Apr. 27, 1976, Ser. No. 680,757
Int. Cl.[2] C21C *5/40*
U.S. Cl. 266—44 **24 Claims**



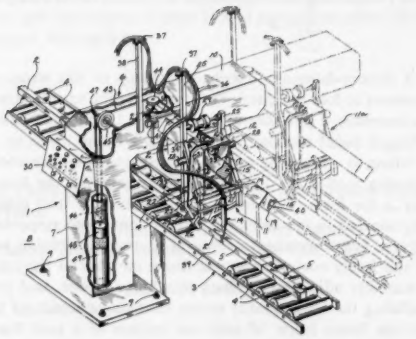
1. In the conservation of energy from the off-gas generated during refining of steel in the basic oxygen steel-making process wherein the concept of dual furnaces is employed, the first furnace doing the refining and the second furnace doing the pre-heating of the solid charge for the subsequent heat by means of the energy contained in said off-gas, the improved method of providing ducting means to direct said off-gas from the mouth of said first furnace doing the refining through the mouth of said second furnace doing the pre-heating in such a way that the discharge end of said ducting means is within said second furnace and in close proximity to the solid charge within said second furnace for the efficient transferrence of the heat energy from said off-gas to said solid charge, in order to guarantee the impingment of said off-gas on top of said solid charge for the efficient transferrence of the heat energy from said off-gas to said charge, and reacting said off-gas with an oxidizing agent in order to transfer to said solid charge with said second furnace the sensible heat contained in said off-gas and also the energy released from the combustion of said off-gas.

4,072,300

CONTINUOUS CASTING CUT-OFF DEVICE

Alfred Pfeuffer, Neu-Isenburg, Germany; Herbert Rudolf, Brookfield, and Fred Balfanz, Waukesha, both of Wis., assignors to C-R-O, Inc., Menomonee Falls, Wis.

Filed Nov. 11, 1976, Ser. No. 741,289
Int. Cl.[2] B23K *7/00*
U.S. Cl. 266—50 **18 Claims**



1. For use with a continuous metal casting apparatus wherein a metal bar moves continuously along an elongated longitudinally extending bed, a cut-off apparatus for the bar, said apparatus comprising:

(a) a fixed frame support member adapted to extend transversely over the said bed,

(b) a carriage assembly with said assembly carrying bar clamping means and bar cut-off means,

(c) and track means extending longitudinally from said frame support and suspending said carriage assembly therefrom for reciprocable movement thereon,

(d) the outer end of said track means remote from said frame support being unobstructed to facilitate quick removal and replacement of said carriage assembly therefrom.

4,072,301

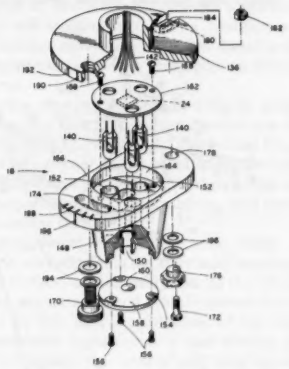
TRACING HEAD AND DRIVE

Frans Brouwer, Glencoe, Ill., assignor to Stewart-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 386,556, Aug. 8, 1973. This application Sept. 18, 1975, Ser. No. 614,651
Int. Cl.[2] B23K *7/10*
U.S. Cl. 266—60 **8 Claims**

1. For use in a contour tracing system, a tracing head comprising a shaft, a housing assembly rotatably carrying said shaft, a steering motor carried by said housing for rotating said shaft, a photocell assembly, circuit means responsive to a signal from said photocell assembly for controlling said motor to rotate said shaft, an optical assembly including a housing for carrying said photocell assembly, means carried by said shaft for rotation therewith, respective indicia including a zero mark on said shaft carried means and on said optical assembly housing, first means connecting said optical assembly housing to

said shaft means for securing said optical assembly to said shaft for rotation with said shaft, and first eccentric means rotatable about the axis of said connecting means with said zero marks in registration for translating said optical assembly housing and photocell assembly transverse to a line extending from said shaft carried means zero mark to the axis of said shaft to provide said photocell assembly with zero kerf adjustment in response to said photocell assembly being in registration with said line, and means extending through the housing and into the shaft carried means opposite said eccentric permitting rotation of said housing about said first connecting means thereby providing the normal kerf adjustment.

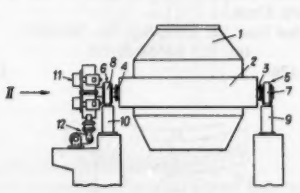


4,072,302

TILTABLE METALLURGICAL VESSEL ARRANGEMENT

Ernst Riegler, Enns, and Manfred Schmidt, Linz, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Jan. 31, 1977, Ser. No. 764,202
Claims priority, application Austria, Feb. 18, 1976, 1140/76
Int. Cl.[2] C21C *5/46*
U.S. Cl. 266—245 **6 Claims**



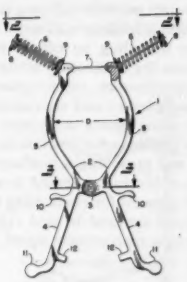
1. In a tiltable metallurgical vessel arrangement, in particular a converter to be used in a steel making plant, of the type including horizontal carrying trunnions for carrying the vessel, a fixed bearing and an expansion bearing accommodating the carrying trunnions, bearing housings in which the fixed bearing and the expansion bearing are arranged, force measuring means for mounting the bearing housings thereon, and a supporting construction, the force measuring means resting on the supporting construction, vertical guide means with their lateral dimension extending parallel to the axes of the carrying trunnions for guiding the bearing housings thereon, the improvement characterized in that the vertical guide means are constituted by vertical sliding faces provided on each bearing housing and on the supporting construction at both sides of the axes of the carrying trunnions so as to form guides and counterguides engaging each other so as to prevent horizontal movement of the bearing housings in the direction of the axes of the carrying trunnions.

4,072,303

SPRING CLAMP FOR PAPER LOGS

Ferdinand W. Szabo, 17251 McCracken Road, Maple Heights, Ohio 44137

Filed Apr. 11, 1977, Ser. No. 786,263
Int. Cl.[2] B25B *1/04*
U.S. Cl. 269—131 **2 Claims**



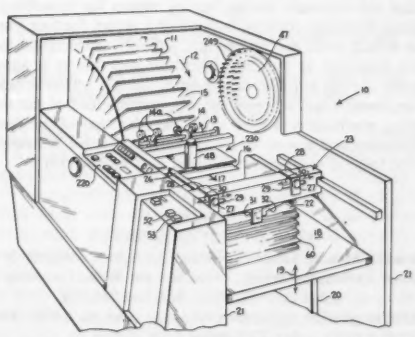
1. A spring clamp for holding a log made of rolled-up newspapers from unrolling during installation of ties around the end portions of the log, comprising a pair of curved jaws hinged together at one end for movement toward and away from each other, said jaws having handles which diverge from said one end thereof and which are adapted to be squeezed together to move said jaws away from each other; and spring means acting on the spaced apart free ends of said jaws for yieldable movement of said jaws as aforesaid into and out of engagement with a log therebetween; said spring means comprising laterally extending elongated slender springs which at one end bear on said free ends, and a flexible cord secured to the other end of said springs and extending through openings in said free ends and across the space therebetween to embrace the portion of the log between said free ends; said springs buckling to longitudinally curved form upon movement of said jaws away from each other thus to yieldably actuate said jaws to grip a log with approximately constant force despite wide variation of log diameter.

4,072,304

COLLATOR SYSTEM

Michael A. Brown, Norwalk, and Hans C. Mol, Wilton, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Oct. 20, 1975, Ser. No. 623,627
Int. Cl.[2] B65H *39/045*
U.S. Cl. 270—58 **1 Claim**



1. A rotary drum collator operating in a RUN/REJECT mode, comprising:

a rotatable drum having a plurality of pockets for storing

quantities of sheet material to be collated into sets, said pockets being angularly arranged about said drum;

rotatable withdrawing means disposed adjacent said drum for removing the sheet material from the pockets of said drum;

stacking means disposed adjacent the withdrawing means for stacking sheet material in a stack composed of collated sets positioned in alternately off-set stack sets during normal operation, and stacking miss-collated sheet material in said stack in a reject position differing from the alternately stacked sets when a feeding malfunction is detected, said stacking means including an off-set mechanism having alternating means for alternately actuating and deactuating said off-set mechanism, and program switching means electrically connected to said alternating means for operating said alternating means in a cyclic manner;

sensing means for sensing a malfunction in the feeding of said sheet material and providing a malfunction signal; and

cycling means operatively connected to said sensing means and said stacking means for controlling the stacking means to stack the sheet material in said reject position in response to a feeding malfunction signal.

4,072,305

PHOTOCOPYING MACHINE HAVING A REPEAT MECHANISM

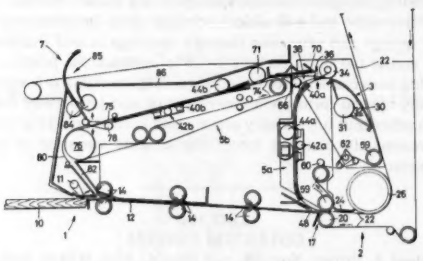
Karl Scheid; Werner Schweisfurth, both of Siegen, and Eberhard Quast, Friesenhagen, all of Germany, assignors to Meteor-Siegen Apparatebau Paul Schmeck GmbH, Siegen, Germany

Filed Aug. 30, 1976, Ser. No. 718,617

Claims priority, application Germany, Sept. 6, 1975, 2539799

Int. Cl.[2] B65H *29/64*

U.S. Cl. 271—3 **7 Claims**



1. Photocopying machine comprising a repeat mechanism which, after an original has left the exposure station, optionally returns said original into the entry position, a feed mechanism guiding the original and the copying material past an exposure station, a separating station arranged in the feeding direction behind the exposure station having means for detaching the original from the copying paper and a return feeding mechanism which picks up the original, supplies the original to the entry members at the entry position and moves it simultaneously for the purpose of alignment against a lateral bearing or abutment edge, wherein the conveying speed of the return feeding mechanism is somewhat less than that of the feeding mechanism and a loop of the original is formed between the return feeding mechanism and said feed mechanism.

4,072,306

SHEET FEED APPARATUS

Hermann Idstein, Oestrich-Winkel, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

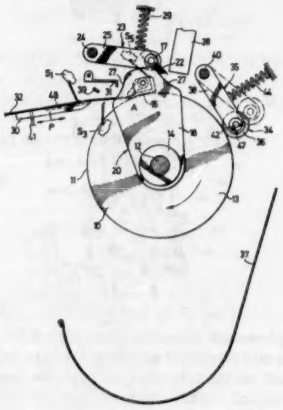
Filed Oct. 15, 1976, Ser. No. 732,852

Claims priority, application Germany, Oct. 16, 1975, 2546463

Int. Cl.[2] B65H *5/04, 9/06*

U.S. Cl. 271—3 **28 Claims**

1. A sheet feed apparatus suitable for feeding an original into a copying machine at an intake position and through the machine past an exposure station, said apparatus comprising a rotary support having a surface for supporting the original, means selectively rotatable with said rotary support and including selectively closable jaws for gripping the leading edge of the original, means for selectively coupling and decoupling said gripping means for rotation with said support, means in advance of the exposure station for pressing the original against the supporting surface, means associated with said



rotary support for conveying the orginial in contact with said supporting surface when the gripping means is stationary, and means for releasing the original from the gripping means for releasing the original from the gripping means at a discharge position after the support has made a predetermined number of revolutions, whereby multiple revolutions of an original and particularly one which is longer than the surface of the rotary support are possible.

4,072,307

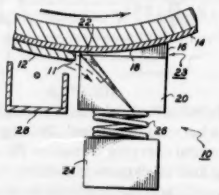
CORNER SHEET STRIPPER

James J. Knieser, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 25, 1977, Ser. No. 781,892

Int. Cl.[2] B65H *29/56*

U.S. Cl. 271—174 **13 Claims**



1. In a copier in which images are formed on an imaging area of an imaging surface moving in a normal direction and transferred to a copy sheet, and in which said imaging surface also has a defined non-imaging edge area thereon adjacent to but outside of said imaging area, wherein the copy sheet is adhered to said imaging surface directly adjacent to, but not within, said edge area of said imaging surface, during said transfer, and wherein the adhering copy sheet is stripped from said imaging surface by a sheet stripping system engaging the lead edge thereof; the improvements in said sheet stripping system comprising:

a mechanical copy sheet stripping member mounted to said

copier adjacent a desired stripping point along said moving imaging surface,

said stripping member having a bearing portion with a bearing surface which directly slidably engages said imaging surface only in said edge area thereof, outside of said imaging area thereof,

said bearing surface being the only portion of said stripping member engaging said imaging surface,

said stripping member having resilient mounting means for movement of said stripping member together with movement of said imaging surface in a direction perpendicular to said normal movement direction directly controlled by said engagement of said bearing portion thereof with said edge area,

said stripping member having an integral stripping finger portion with a sheet stripping edge thereon for mechanically engaging and stripping a copy sheet from said imaging area at a corner of the sheet adjacent said edge area,

said stripping finger portion and said stripping edge thereon being mounted to, and supported by, said bearing portion for movement therewith,

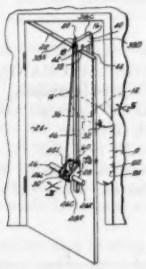
said stripping finger portion extending from said bearing portion in said edge area out over said imaging area of said imaging surface, continuously spaced therefrom, with said stripping edge maintained closely spaced from said imaging area by less than the thickness of the copy sheet by said continuous engagement of said bearing portion with said non-imaging edge area of said imaging surface.

4,072,308

PORTABLE WEIGHT LIFTING TYPE FOREARM EXERCISER

Leslie T. Applegate, Cincinnati, Ohio, assignor to Surgical Appliance Industries, Inc., Cincinnati, Ohio

Filed Apr. 7, 1977, Ser. No. 785,766
Int. Cl.[2] A63B *21/06*
U.S. Cl. 272—117 **4 Claims**



1. A forearm exerciser comprising:

a rigid U-shaped frame means adapted to be secured over the top of a door, said means including first and second spacedapart generally parallel legs and a transverse cross-member rigidly underconnecting said legs each other at their upper ends,

a clamp means mounted on the lower end of the first leg and movable against one face of a door for urging the second leg against the other face of the door when the legs straddle the door faces with the cross-member resting atop the upper edge of the door,

a cable guide on said transverse cross member,

a flexible cable slidably engaged with said guide, said cable having first and second ends,

a weight attached to said first cable end,

a rod attached to said second cable end, said rod having a hand-engageable section to facilitate gripping said rod with a user's hand, and

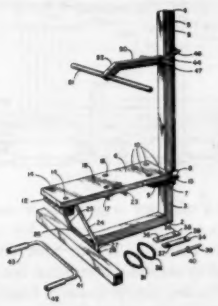
a rotatable mount means secured to said second leg for mounting said rod for rotation about a generally horizontal axis generally perpendicular to said second leg to facilitate reeling and unreeling said cable on said rod, and in turn raising and lowering said weight, when said rod is gripped by a user's hand and rotated in first and second opposite directions, respectively.

4,072,309

MULTI-PURPOSE EXERCISE DEVICE

Jerry Lee Wilson, 5816 Vista Clara, El Paso, Tex. 79912

Filed June 21, 1976, Ser. No. 698,463
Int. Cl.[2] A63B *21/04*
U.S. Cl. 272—136 **8 Claims**



1. Multiple purpose exercise apparatus comprising:

a frame having forward and rearward positions comprising a ground-supported base and a stationary vertical support member extending upwardly from the rear of the base,

a bench, support means associated with said frame for maintaining the bench at a level above the base,

a lever arm pivotally attached to said vertical support member and extending outwardly over said base, fastening means for securing the lever arm to the support member comprising a plurality of vertically aligned bores in the support member, a transverse bore carried by the rearward portion of the lever arm, and pin means extending through both bores for removably pivotally attaching the lever arm to the vertical support member such that the lever arm can move freely only in a vertical plane, biasing means attachable to the lever arm at a position spaced from the connection of the lever arm on the vertical support member for selectively providing resistance to upward or downward motion of the lever arm in the vertical plane, and

attachment means mountable in the vertically aligned bores for selectively attaching the biasing means at various position on the vertical support member.

4,072,310

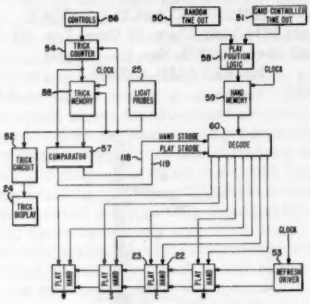
CONTROL APPARATUS FOR A CARD GAME SIMULATOR

Dale R. Beam, 3243 Windmill Drive, Dayton, Ohio 45432

Filed Jan. 15, 1976, Ser. No. 649,504
Int. Cl.[2] A63B *9/00*
U.S. Cl. 273—1 E **18 Claims**

1. A card game simulator comprising a plurality of hand displays each of which has a plurality of light generating elements for representation of playing cards capable of being held by that hand, card assignment means for assigning playing cards to each such hand, a recirculating hand memory for storage of said card assignments, illumination control means responsive to said hand memory for periodically activating in each hand display the light generators representing cards assigned to that hand, a photosensitive detector for detecting illumination of any of said light generators when placed in close proximity thereto, a recirculating trick memory synchronized with said hand memory and actuated by an output from

said detector for remembering the time period of said output, and gating means connected to said trick memory for preventing said illumination control means from activating a light generator during occurrence of time periods remembered by said trick memory; said trick memory comprising a trick code generator, means for loading codes from said trick code generator into the trick memory in response to output signals from said detector, output terminal means for reading out trick codes previously loaded into said trick code memory, and means connected to said output terminal means for generating control strobes for said gating means in response to trick codes read out from said output terminal means.

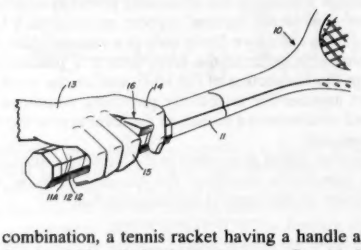


4,072,311

INDEX FINGER POSITIONING DEVICE FOR TENNIS RACKET HANDLES

Shirley J. Bertucci, 6126 St. Charles Ave., New Orleans, La. 70118

Filed Aug. 30, 1974, Ser. No. 501,972
Int. Cl.² A63B *69/38*
U.S. Cl. 273—75 **1 Claim**



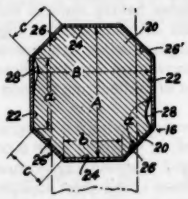
1. In combination, a tennis racket having a handle and ball striking head, said handle having at least one flat side lying in the plane of said ball striking head, an index finger positioning device comprising an upstanding finger engaging means positioned on said at least one flat side at a point along its length to lie between the index finger and the middle finger when the racket is grasped by a player in a playing position, said upstanding finger engaging means in plan view being generally of an obtuse triangular construction having rounded ends and in a side elevation being tapered upwardly on a curve from its base toward its apex with the long side being positioned angularly across the major axis of the handle and the base being substantially parallel to the major axis of the handle and being aligned with the edge of said at least one flat side and upstanding therefrom, said finger engaging means being in a fixed position along the axis of the racket handle dependent upon the side of the players hand and playing grip, and securing means positively locating and maintaining said upstanding finger engaging means on said handle in said fixed position.

4,072,312

TENNIS RACQUET HANDLE CONSTRUCTIONS

Benjamin Kahn, 1605 Michigan Ave., Miami Beach, Fla. 33139

Filed Jan. 20, 1976, Ser. No. 650,689
Int. Cl.² A63B *49/08*
U.S. Cl. 273—75 **9 Claims**



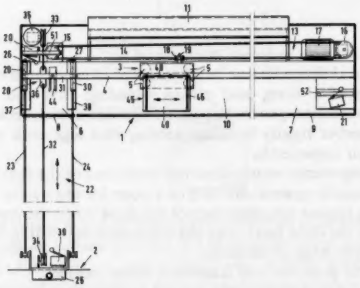
1. In a tennis racquet of the character described having a playing face adapted for ball-striking, a longitudinal octagonal-like handle providing a pair of parallel and opposed grip-embracable longitudinal surfaces spaced apart and parallel to the plane of said ball-striking surfaces, and another pair of spaced, opposed and parallel grip-embracable longitudinal surfaces at right angles to the first mentioned pair, the transverse distance between the surfaces of the first mentioned pair of surfaces being less than 84% of the transverse distances between the surfaces of the second mentioned pair, whereupon gripping of the handle, the said difference in said transverse distances between the said pairs of surfaces is sensibly perceptive and mentally impressive upon the grip of the player, whereby the disposition of the handle and the ball-striking surface is orientatively discerned before the players stroke without observation or physical contact with the racquet other than by a single-hand grip, and also whereby the said distance difference discernment is retained throughout the players stroke and diametrically opposed scollups each extending along an edge of its containing surface.

4,072,313

TARGET MECHANISM

Bernhard Murso, Esslingen-Hegensberg, and Eberhard Riedmüller, Seissen, both of Germany, assignors to Ernst K. Spieth, Zell (Neckar), Germany

Filed Mar. 31, 1976, Ser. No. 672,185
Claims priority, application Germany, Apr. 17, 1975, 2516986
Int. Cl.² F41J *9/00*
U.S. Cl. 273—105.2 **13 Claims**



1. A target mechanism for a shooting range having a marksman's station and a target station, comprising a transverse guide means mounted on the target station transversely of the line of fire, a target cart mounted for movement along the transverse guide means between two end positions, a transverse drive mechanism for moving the target cart in either

direction on the transverse guide means, a motor for driving the transverse drive mechanism, a longitudinal guide means extending between the marksman's station and the target station adjacent to one end of the transverse guide means, a sliding carriage mounted for reciprocating movement along the longitudinal guide means from the target station and the marksman's station between two end positions, the sliding carriage being adapted to receive the target cart when it is in its one end position at the target station, a longitudinal drive mechanism connected with the sliding carriage for moving it along the longitudinal guide means between its two end positions, and a motor for driving the longitudinal drive mechanism.

4,072,314

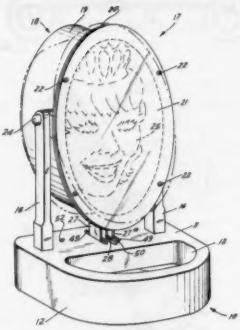
SOUND-PRODUCING MIRROR TOY

Beverly Rosen, East Brunswick, and Sidney A. Tepper, Millburn, both of N.J., assignors to Lasco Toys International Inc., East Brunswick, N.J.

Filed July 27, 1976, Ser. No. 709,063

Int. Cl.[2] A63F *9/18*

U.S. Cl. 273—161 **11 Claims**



1. A sound-producing mirror toy, comprising:

(a) a base,

(b) a housing movably mounted on said base,

(c) a mirror comprising one wall of said housing, said mirror being of the type which reflects light from its front surface when there is darkness behind it and which becomes transparent when there is light behind it, said mirror comprising a transparent sheet carrying a metal coating, and said mirror being planar so that it faithfully reflects the image of a person looking at it,

(d) a representation within said housing behind said mirror,

(e) a light source within said housing behind said mirror,

(f) an electrical sound-producing mechanism, and

(g) means for simultaneously energizing said light source, to make said representation visible through said mirror, and for actuating said sound producing mechanism.

4,072,315

TURNTABLE DIRECT-DRIVE SYSTEM

Toshio Tsujihara, Kobe; Humitoshi Saito, Kyoto, and Teruaki Kitamori, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Mar. 30, 1976, Ser. No. 672,002

Claims priority, application Japan, Apr. 7, 1975, 50-42644; Apr. 7, 1975, 50-47541; Nov. 6, 1975, 50-151482; Nov. 6, 1975, 50-151483; Nov. 6, 1975, 50-151484

Int. Cl.[2] G11B *17/00, 3/60;* H02K *1/22*

U.S. Cl. 274—1 E **6 Claims**

1. In a turntable direct drive system comprising:

a base;

a vertical turntable shaft extending upwardly from said base;

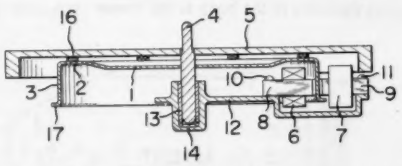
rotatable means having a horizontal surface portion and a downwardly extending cylindrical peripheral lip, said means being mounted on said shaft and including a turntable surface adjacent said horizontal surface portion;

a first stator core with a drive winding thereon adjacent said base within said peripheral lip and spaced a first predetermined distance from said lip; and

a second stator core with a drive winding thereon adjacent said base outside said peripheral lip in juxtaposition with said first stator core and spaced a second predetermined distance from said lip,

said stator cores and windings cooperating to be adapted to exert a driving force on said peripheral lip to cause said rotatable means to rotate about the axis of said shaft;

the improvement wherein said rotatable means comprises (i) a cylindrical rotor of non-magnetic electrically conductive material having said horizontal surface portion and cylindrical lip, said rotor lip having an outwardly extending edge protruding from the bottom of said lip and extending beneath a portion of said second stator core to prevent movement of said rotor away from said base, (ii) a separate turntable coupled to said rotor for rotation therewith, said turntable being spaced apart from a major part of said horizontal surface portion of said rotor, said turntable having said turntable surface, the weight of said rotor being substantially less than the weight of said turntable, and (iii) coupling means between said rotor and said turntable for providing a rotational force to said turntable while isolating said turntable from vibrations of said rotor and from warping forces due to any warped condition of said rotor.



4,072,316

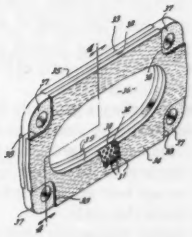
THREE-PIECE HEAT RESISTANT GASKET

John W. Decker, Stockbridge, and Myron W. Tubbs, Royal Oak, both of Mich., assignors to Eagle-Picher Industries, Inc., Cincinnati, Ohio

Filed Nov. 26, 1976, Ser. No. 745,094

Int. Cl.[2] F16J *15/12*

U.S. Cl. 277—235 B **12 Claims**



1. A heat resistant gasket comprising,

a one-piece rigid heat insulating body of molded resin and having

a web portion presenting two oppositely facing planar parallel faces, the web portion surrounding at least one fluid passage which extends through it from one said face to the other, and

a plurality of bolt hole-presenting bosses integral with said web portion and projecting outwardly from said faces,

a two compressible gaskets elements, each a flat slab

formed from a resilient gasket material which is heat insulative, said elements being adhesively secured to the respective planar faces of the web portion of said rigid body,

said bosses by their outward projection from said faces establishing seats on said web portion on which they position said gasket elements,

each said gasket element abutting the bosses which thereby locate the gasket element on its seat with respect to said passage,

each said gasket element having an opening through it which is substantially congruent with the fluid passage in said rigid body,

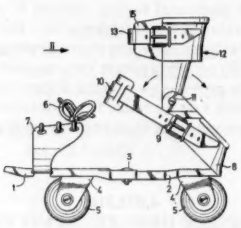
the combined thickness of the web portion and the two gasket elements secured thereon being greater than the thickness of the body at the bosses.

4,072,317

ROLLER SKATE HAVING ANKLE BRACING SUPPORT

Rudiger Pommerening, Glocksee 110, 3216 Salzhemmendorf, Germany

Filed May 17, 1976, Ser. No. 687,433
Claims priority, application Germany, May 17, 1975, 2522199
Int. Cl.[2] A63C *17/06, 3/02*
U.S. Cl. 280—11.23 **13 Claims**



1. A single tracked roller skate, comprising:

a base,

a plurality of rollers, arranged along a single track,

means mounting said base on said plurality of rollers,

first and second fastening means on said base for fastening said skate to the foot of a wearer, said first fastening means being located adjacent the front of the base and said second fastening means being located adjacent the back of said base for fastening the ankle of a wearer, said second fastening means comprising:

heel grip means including a generally U-shaped, rigid yoke member which is rigidly secured to the rear of said base and projects obliquely upwardly and forwardly therefrom to surround the heel of the wearer,

an ankle strap on said heel grip means for encircling the foot of a wearer about the ankle,

ankle support means engageable with the leg of a wearer immediately above the ankle, said ankle support means including a cradle for supporting engagement with the leg of a wearer, said ankle support cradle being a concave C-shape in cross section and inwardly convex in longitudinal section, and

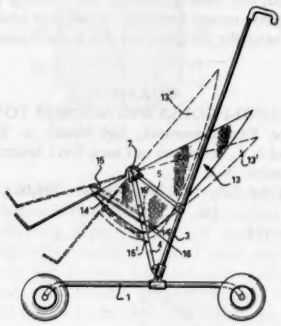
means pivotably mounting said ankle support means on said heel grip means at a point adjacent to the wearer's ankle, so as to permit pivotal displacement with respect to said base about an axis substantially parallel to the rolling axis of said rollers.

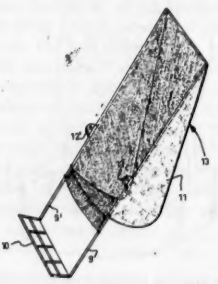
4,072,318

BABY CARRIAGE

Pierre Laune, Attiches, France, assignor to Eurolando, Attiches, France

Filed Oct. 12, 1976, Ser. No. 731,375
Claims priority, application France, Oct. 9, 1975, 75 30904
Int. Cl.[2] B62B *7/08*
U.S. Cl. 280—42 **6 Claims**





1. A baby/child carriage of the type having a transversely collapsible chassis and a body mounted thereon to support the baby or child either in a prone or in a sitting position; said body comprising:

(a) two lateral members independent of and parallel to each other and pivotally mounted on the chassis by two pivot pins forming articulations for said lateral members on the chassis, thus permitting each of the lateral members to pivot in a vertical plane;

(b) manually operable means for locking each of the lateral members in a plurality of determined angular positions with respect to the chassis, and;

(c) a flexible support forming structure connected to the lateral members and adapted to accommodate the baby or child; thus enabling the two lateral members to be brought together to form a collapsed bundle when the chassis is put in collapsed position.

4,072,319

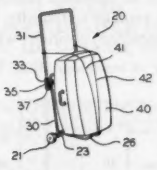
HAND TRUCK WITH RETRACTABLE FRAME

Henry D. Berger, Chicago, Ill., assignor to Kimberly Rose Company, Inc., Chicago, Ill.

Filed Apr. 19, 1976, Ser. No. 678,245
Int. Cl.[2] B62B *3/00*
U.S. Cl. 280—47.37 R **8 Claims**

1. A hand truck having a pair of frame members which slide together or apart relative to each other so that they may be moved between extended and retracted positions, said pair of members comprising two separate, U-shaped members positioned in a front to back relationship, two pairs of fitting means

for slidingly joining opposing arms of the pair of U-shaped members, and latch means on each pair of said fitting means for releasably securing together that pair and therefore the pair of



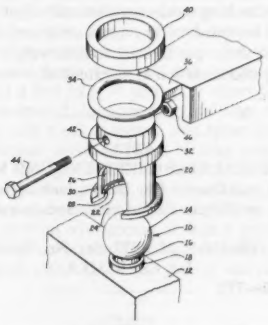
U-shaped members when extended apart, said latch means both latching and unlatching responsive to forces applied directly to the frame to extend or retract the U-shaped members.

4,072,320

COUPLING ELEMENT FOR TRAILER HITCHES

Leon A. Powell, 2144 W. Broadway No. 67, Phoenix, Ariz. 85041

Filed Aug. 5, 1976, Ser. No. 712,094
Int. Cl.[2] B60D *1/14*
U.S. Cl. 280—415 A **4 Claims**



1. A device for coupling a hitch ring of a trailer tongue to a ball-type trailer hitch having a ball member and a neck of reduced cross-sectional dimension connecting said ball member to a towing vehicle, said device comprising:

a. an elongated tubular member penetratingly insertable within the hitch ring for engaging the ball member of the hitch and for transmitting horizontally oriented forces from the hitch ring to the ball member, said tubular member having an inner chamber for receiving the ball member;

b. a partially cutaway annular flange positioned on one end of said tubular member for receiving and partially circumscribing the neck, the cutaway portion of said flange forming a first orifice dimensioned to accomodate the nect but not the ball member, said flange having an outer diameter greater than the outer diameter of said tubular member and an inner diameter less than the diameter of the ball member;

c. a second orifice located in the wall of said tubular member coincident with opposed edges of said first orifice and communicating with said chamber, said second orifice being dimensioned to permit removal of the ball member from said chamber therethrough by relative lateral displacement between said tubular member and the hitch;

d. first retaining means slidably locatable along the longitudinal axis of said tubular member and positionable around said tubular member adjacent said flange for closing off said second orifice and precluding lateral displacement of the ball member from within said chamber; and

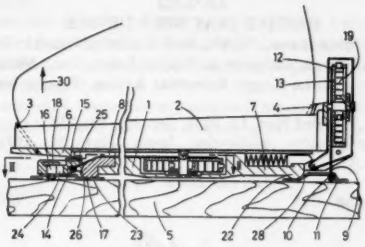
e. second retaining means removably locatable along the longitudinal axis of said tubular member for retaining the hitch ring adjacent said first retaining means and in a fixed relationship with respect to the longitudinal axis of said tubular member.

4,072,321

LOST MOTION ANCHOR FOR A SELF-RESTORING SKI BINDING

Francis Vaudaux, Boege, France, assignor to The Garcia Corporation, Teaneck, N.J.

Filed Apr. 27, 1976, Ser. No. 680,859
Claims priority, application France, May 2, 1975, 75 13803
Int. Cl.[2] A63C *9/00*
U.S. Cl. 280—637 **12 Claims**



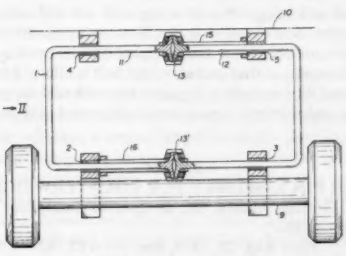
1. In a ski binding comprising a sole plate; at least one flexible connection connecting an extremity of said sole plate to a ski and at least one elastic tension device associated with said flexible connection and placing a continuous tension thereon for releasably retaining said sole plate on said ski; an improved anchor means for securing said flexible connection to said ski which comprises: a base plate secured to the surface of said ski; a post arranged perpendicularly to said base plate; a head pivotally connecting an end of said flexible connection to said post; and guide means on one of said base plate and said head for permitting rotational and limited longitudinal sliding movement of said head in relation to said base plate as said sole plate moves into and out of position adjacent said head.

4,072,322

AXLE SUSPENSION SYSTEMS FOR A VEHICLE

Dietrich Fuchs, Karlsfeld, and Albin Luttner, Munich, both of Germany, assignors to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft, Munich, Germany

Filed Oct. 4, 1976, Ser. No. 729,417
Claims priority, application Germany, Oct. 14, 1975, 2545904
Int. Cl.[2] B60G *15/00*
U.S. Cl. 280—713 **10 Claims**



1. An apparatus for supporting a vehicle body having a

longitudinal axis, an axle means extending transversely to said longitudinal axis, comprising stabilizer means for connecting the vehicle body to said axle means, said stabilizer means comprising frame means including two frame members, each member including a respective first and second arm, means rigidly interconnecting corresponding arms to each other at one end thereof, said first and second arms also extending transversely of said longitudinal axis, flange means interconnecting the opposite ends of the first arms to each other and also the opposite ends of the second arms to each other, means pivotally mounting said first arms to said body and said second arms to said axle, first and second rigid force transmitting means connected to the respective flange means at one end of the first and second force transmitting means, while the other end of the first force transmitting means is connected to the vehicle body and the other end of the second force transmitting means is connected to the axle.

4,072,323

PASSIVE SEAT BELT DEVICE

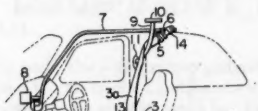
Toshiaki Shimokawa, Nishio, and Kunitaka Suzuki, Toyota, both of Japan, assignors to Nippon Soken, Inc., Nishio and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Nov. 12, 1975, Ser. No. 631,238

Claims priority, application Japan, Nov. 14, 1974, 49-138189[U]

Int. Cl.[2] B60R *21/02*

U.S. Cl. 280—745 **6 Claims**



1. A passive seat belt device for use with an occupant in a motor vehicle comprising: a seat belt means having at least a shoulder belt which is secured at its one end to the inner and upper side portion of a compartment of the vehicle for tightening said occupant in position; a drive mechanism including a rail running along the side edge of the inner roof portion of said compartment, hanger means which slidably hang said shoulder belt and being capable of shifting along said rail forwards and rearwards, said seat belt driving means automatically bringing said seat belt means into an occupant-tightening position when a door of the vehicle is closed and into an occupant-releasing position when said door is opened; and a support arm which is positioned over said rail a short distance from the inner side wall of said compartment with its opposed ends fixed above and below said rail and spaced forward of the rearward end position of said hanger means along said rail and with which said shoulder belt engages to be kept away from the neck portion of said occupant, said support arm extending in the vertical direction so that said shoulder belt is allowed to move upwards and downwards in engagement with said support arm whenever said seat belt means is moved toward said occupant.

4,072,324

SHEAR PIN ASSEMBLY FOR COUNTERWEIGHTS

Bobby D. Griffith, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

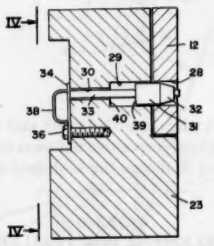
Filed Aug. 19, 1976, Ser. No. 715,742

Int. Cl.[2] B60R *11/00*

U.S. Cl. 280—759 **10 Claims**

1. A shear pin assembly in combination with a counterweight adapted for mounting on a frame of a vehicle comprising

a shear pin reciprocally mounted in a bore formed in said counterweight for movement in first and second opposite directions between an extended position whereby an end of said shear pin extends outwardly from said counterweight and a retracted position within said counterweight,



first stop means for limiting movement of said shear pin in said first direction to hold it in its extended position,

second stop means for limiting movement of said shear pin in said second direction to hold it in its retracted position and

adjustable locking means separate and offset from said shear pin and mounted solely on said counterweight and attaching said shear pin to said counterweight for selectively locking said shear pin at its extended or retracted position thereon.

4,072,325

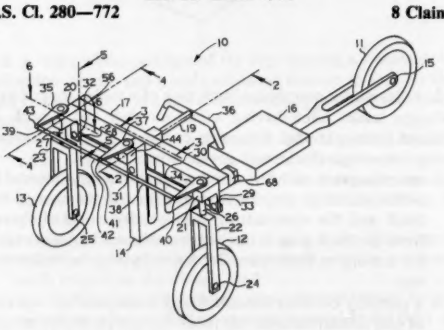
PENDULUM STABILIZED GROUND VEHICLES

Jerd Bright, and Donald Ray Bright, both of Sunnyvale, Calif., assignors to Bright Engineering, Incorporated, Sunnyvale, Calif.

Filed Jan. 28, 1977, Ser. No. 763,681

Int. Cl.[2] B62D *9/00*

U.S. Cl. 280—772 **8 Claims**



1. A ground vehicle including, in combination, suspension frame means, ground wheel means, ground wheel support means, means coupled to proximate extremities of said suspension frame means for pivotally supporting said ground wheel support means, pendulum means, means centrally coupled to said suspension frame means for pivotally supporting said pendulum means such that said pendulum means depends downwardly from said suspension frame means, means for intercoupling said pivotally supported ground wheel support means and said pivotally supported pendulum means such that motion of said pivotally supported pendulum means transverse to the direction of travel of said vehicle causes a corresponding motion of said pivotally supported ground wheel support

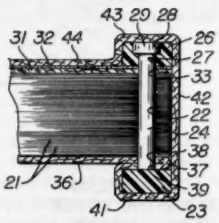
means and hence, of said attached ground wheel support means and said ground wheel means.

4,072,326

WRAP-AROUND COVER FOR BOOKS

Charles T. Groswith, III, Los Altos, and Ralph M. Woodley, Palo Alto, both of Calif., assignors to Velo-Bind, Inc., Sunnyvale, Calif.

Filed July 19, 1976, Ser. No. 706,496
Int. Cl.[2] B42D *1/00, 3/00*
U.S. Cl. 281—29 **14 Claims**



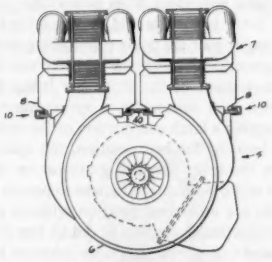
1. A book comprising a plurality of sheets, a first end cover, a second end cover, a spine cover, a first binding strip overlying the spine margin of said first end cover, a second binding strip overlying the spine margin of said second end cover, cooperating binding means on said strips for securing said strips together, said sheets, both said end covers, said second binding strip and a first edge of said spine cover formed with aligned apertures spaced along the marginal edge of said book for reception of said binding means, said spine cover having said first edge bound under said first binding strip and being wrapped around an edge of said first strip opposite said spine, over the outside of said first strip, over the outside of the spine of said book, over the outside of said second strip and having an overlapping portion overlapping at least a portion of said second end cover, and means securing said overlapping portion to said at least a portion of said second end cover.

4,072,327

SLIP JOINT BETWEEN A GAS TURBINE ENGINE AND A HEAT EXCHANGER

D. Craig Young, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 1, 1976, Ser. No. 728,589
Int. Cl.[2] F16L *39/04*
U.S. Cl. 285—137 R **6 Claims**



1. In an assembly having first and second bodies, the first body including a rectangular-shaped hot gas discharge manifold defining a first flange thereabout having a flat surface, the second body including a rectangular-shaped hot gas inlet manifold defining a second flange thereabout having a flat surface, the first and second bodies affixed one to the other at a point remote of said manifolds and with said flat surfaces in an abutting relation, and said first and second bodies having different thermal expansion rates, a slip joint for connecting the hot gas discharge manifold of the first body to the hot gas inlet manifold of the second body, the slip joint comprising:

clamp means fixed relative the first body allowing limited translational movement of second body relative the first body while sealingly allowing the hot gas discharge manifold to communicate gases from the first body to the second body through the hot gas inlet manifold under varying temperature conditions;

the clamp means comprising a plurality of generally rectilinear C-shaped members, each having an open side, opposing base sides, and a closed side opposite the open side, and wherein each C-shaped member may be disposed with the open side thereof in a clamping relationship with the first and second flanges, while said first and second flanges are in an abutting relation;

said first flange defining a plurality of spaced-apart threaded bores;

a base side of each C-shaped member defining a plurality of holes each alignable with the spaced-apart threaded bores of the first flange, and each hole of larger diameter than the threaded bore;

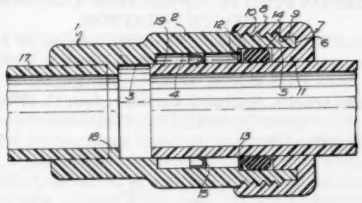
the assembly further comprising bolt means threadably disposable in said bore and extending outwardly therefrom through said aligned holes so that said C-shaped member is retained in a clamping relation with the first and second flanges.

4,072,328

PIPE COUPLINGS

David Robert Elliott, Burnley, England, assignor to Hepworth Plastics Limited, Sheffield, England

Filed May 25, 1976, Ser. No. 689,833
Int. Cl.[2] F16L *27/00, 47/02*
U.S. Cl. 285—169 **9 Claims**

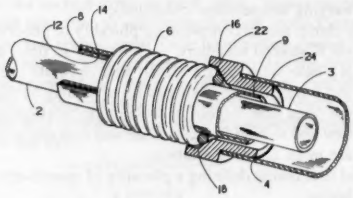


1. A pipe coupling comprising a socket portion at one end of a bore, with a first internal radial enlargement adjacent the bore, a first shoulder being defined between said first enlargement and said bore, and a second radial enlargement adjacent the end of the socket portion remote from the bore, an end cap having an opening through which a pipe is inserted into the bore, said end cap having an outer portion adapted to be secured on the outside of the socket portion and an inner portion with an internal diameter substantially equal to that of the bore, a washer adjacent a second shoulder at the junction between the enlargements and having an internal diameter substantially equal to that of the bore, a resilient sealing ring housed between the inner portion of the end cap and the washer, and a toggle ring located between said washer and said first shoulder, said toggle ring being slidable along the first enlargement and having an aperture smaller in diameter than that of the bore, said resilient sealing ring providing a seal between a wall of said second enlargement and the pipe on a portion of said pipe located between said end cap and said slidable toggle ring.

4,072,329
FLEXIBLE FLUID CONNECTING DEVICE

Paul A. Mutchler, University City, Mo., assignor to American Air Filter Company, Inc., Louisville, Ky.

Filed Sept. 20, 1976, Ser. No. 725,034
Int. Cl.[2] F16L *55/00*
U.S. Cl. 285—187 5 Claims



1. A fluid connecting device comprising:

a first conduit member having a first open end, a second conduit member having a first open end, said second conduit member having an inner diameter greater than the outer diameter of said first conduit member, said first open end of said first conduit member coaxially extending into said first open end of said second conduit member;

a resilient flexible sleeve having a first open end and a second open end and surrounding said first conduit member;

said first open end of said sleeve being fixedly attached to said first conduit member in a substantially fluid tight relation;

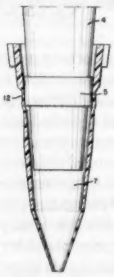
a straight flange end on said flexible sleeve extending inwardly into said second conduit, said straight flange end encircling and being radially spaced from said first open end of said first conduit member, said straight flange end being spaced from said second conduit with sealing means disposed therebetween; and,

said resilient flexible sleeve maintaining said sealing means in sealing position between said second conduit member and said flexible sleeve.

4,072,330
SLIP-ON PIPETTE TIP MEMBER AND PIPETTE DEVICE THEREFOR

Gottfried Brysch, Hamburg, Germany, assignor to Eppendorf Geratebau Netheler & Hinz GmbH, Hamburg, Germany

Filed May 26, 1976, Ser. No. 690,151
Claims priority, application Germany, June 12, 1975, 2526296
Int. Cl.[2] B01L *3/02;* F16L *47/00*
U.S. Cl. 285—239 11 Claims

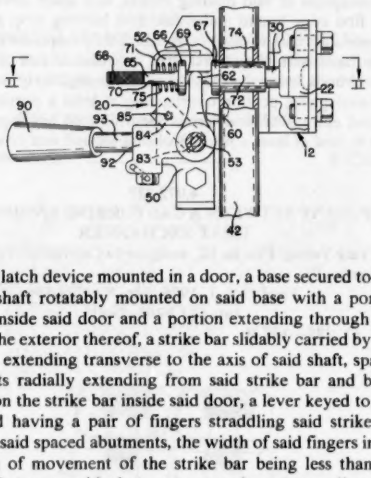


1. An improved slip-on pipette tip member in the form of an elongated receptacle being at least partly of a conical configuration for mating with an adapter cone of a pipette device onto which the tip member is to be engaged, said tip member having a top mounting opening, a bottom fluid intake and discharge opening, and a hollow passageway formed by outer walls and extending between said top mounting opening and said fluid intake and discharge opening for fluid communication therebetween wherein the improvement comprises a sealing zone located along the axial length of said pipette tip member in a position between said mounting opening and said intake and discharge opening to be engaged by a radially projecting collar on the end portion of said adapter cone of said pipette device, said sealing zone comprising a portion of wall area of selectively reduced wall thickness at the outer surface of said tip member, said wall portion of said tip member being more resilient and elastically adaptable in the area of said sealing zone relative to the other walls of said tip member so that said sealing zone is deformable with yieldable characteristics being of reduced rigidity in order to more effectively receive and seal said end of said adapter cone.

4,072,331
DOOR LATCH HAVING THREE-WAY ACTUATION MEANS

Max E. Butterfield, Peoria; Robert M. Alt, Washington, and James E. March, Princeville, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed June 28, 1976, Ser. No. 700,271
Int. Cl.[2] E05C *15/02*
U.S. Cl. 292—173 4 Claims

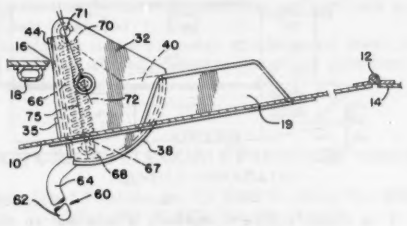


1. In a latch device mounted in a door, a base secured to said door, a shaft rotatably mounted on said base with a portion located inside said door and a portion extending through said door to the exterior thereof, a strike bar slidably carried by said base and extending transverse to the axis of said shaft, spaced abutments radially extending from said strike bar and being located on the strike bar inside said door, a lever keyed to said shaft and having a pair of fingers straddling said strike bar between said spaced abutments, the width of said fingers in the direction of movement of the strike bar being less than the spacing between said abutments, a spring surrounding said strike bar for urging a latch end portion of the strike bar out of the door and into the latched position, the spacing between said fingers on the lever and the abutment on the latch end portion of said strike bar being sufficient to permit the latch bar to be moved to the unlatched position without movement of said lever, exterior handle means keyed to the end portion of said shaft located exterior to said door, interior handle means keyed to the end portion of said shaft located inside the door, whereby pivoting either the interior or exterior handle means will pivot the shaft and the lever to contact one of said abutments to compress the spring and to retract the strike bar into the door, and handle means on said strike bar for moving said strike bar relative to said lever independent of the internal and external handle means for retracting the strike bar from a latched position.

4,072,332
DOOR LATCH HAVING OVERCENTER SPRING

Robert L. Isaia, Roanoke, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed July 19, 1976, Ser. No. 706,717
Int. Cl.[2] E05C 3/04
U.S. Cl. 292—228 8 Claims

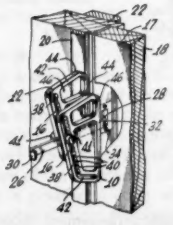


1. In a latch arrangement for securing a panel over an opening in a housing, said panel being hinged to said housing and having a pair of plates projecting inwardly toward the inside of said housing, latch means pivotally mounted about an axis extending between said plates, a projecting portion of said latch means extending from said panel and being adapted to engage an inside wall of said housing to secure said panel over said opening, said latch means is comprised of a pair of spaced walls joined together by a cylindrically-shaped portion having a center on said axis of said pivotal mounting of said latch means, and a base extending between said spaced walls with one end thereof forming said projecting portion, a handle carried by said latch means and extending to a position exterior of said panel, a spring connected at one end to said latch means and connecting at the other end to said plates, said other end of said spring and said axis about which said latch means pivots lying along a fixed axis, movement of said handle pivots said latch means and said spring to shift said spring from a position on one side of said fixed axis to the other side thereof, whereby clockwise movement of said handle and said latch means moves the one end of said spring beyond said fixed axis whereupon the projecting portion of the latch means is disengaged from the inside of said housing and whereby movement of said handle in a counterclockwise direction will move the spring back beyond said fixed axis for positioning said projecting portion of said latch means against the inside wall of said housing for holding the panel latched over the opening into said housing.

4,072,333
REMOVABLE DOOR-LOCKING DEVICE

Charles G. Hutter, III, Hollywood, Calif., assignor to Physical Systems, Inc., North Hollywood, Calif.

Filed Oct. 29, 1976, Ser. No. 736,832
Int. Cl.[2] E05C 19/18
U.S. Cl. 292—292 4 Claims



1. For use with a door that is pivotably mounted in a frame, the door having a latch movable into a cooperating recess in the frame, a removable door-locking device comprising:

a pair of adjacent wedges each having an abutment surface and a locking surface that lies at an acute angle to said abutment surface, each of said wedges having a main slot bounded on one side by said locking surface and a secondary slot extending from said main slot toward said abutment surface to permit said connecting means to move toward said abutment surface;

a hook having a body portion normal to said abutment surfaces that is at least partially disposed between said wedges and capable of projecting from between said wedges past said abutment surfaces, and at least one end portion extending from said body portion at an angle thereto for insertion in said recess; and

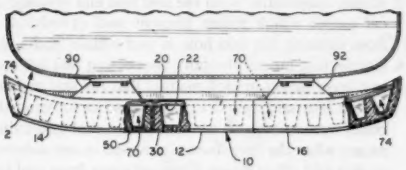
connecting means attached to said hook for slidably engaging said locking surfaces;

whereby one of said abutment surface can engage the door while the other of said abutment surfaces engages the frame to hold the door in a closed position.

4,072,334
ENERGY ABSORBING BUMPER

Wan Seegmiller; Bruce O. Young, both of Sacramento, and Joe A. Story, Davis, all of Calif., assignors to Energy Absorption Systems, Inc., Chicago, Ill.

Continuation of Ser. No. 597,586, July 21, 1975, abandoned.
This application Oct. 15, 1976, Ser. No. 732,944
Int. Cl.[2] B60R 19/08
U.S. Cl. 293—71 R 11 Claims



1. An energy dissipating bumper for a motor vehicle capable of returning to its original configuration after an impact, comprising:

a relatively rigid support member and a bumper module disposed over the support member;

the support member having means for attachment to the vehicle;

the bumper module having a core of compressible, open celled, thermoplastic foam having a continuous front wall and a plurality of spaced apart columns extending rearwardly from the front wall, and a resilient, thermoplastic outer skin enclosing the core, the spaces between the rearwardly extending skin covered columns forming spaced apart, unfilled cavities open to the atmosphere along the rear side of the bumper module;

whereby the collision rebound effect of the foamed core is diminished.

4,072,335
LIFTING DEVICE

Arlan William Tift, 3310 Panorama Drive, Redding, Calif. 96001, and Delbert W. Strait, 5334 Pine St., Anderson, Calif. 96007

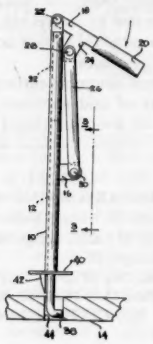
Filed Mar. 7, 1977, Ser. No. 775,105
Int. Cl.[2] B66F 13/00
U.S. Cl. 294—93 3 Claims

1. A device for lifting articles, which articles include a hole of fixed size extending through such article, said device comprising:

1. Rod means with offset means on one end thereof said

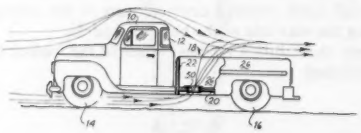
offset means and rod means being of a size so as to be insertable through said article in said hole;

2. Tab means attached essentially perpendicularly to said rod at a distance from said offset means;
3. Elongated cylindrical means slideably mounted about said rod means, with said offset means extending outwardly from the first end of said cylindrical means, said cylindrical means having an elongated opening in its wall suitable to allow said tab means to project outwardly therethrough and of such length that said rod means with said tab means attached can slide within said cylindrical means;
4. Lever means pivotally attached to said cylindrical means at its second end;



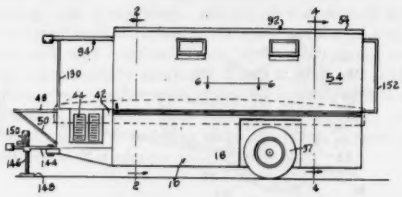
5. Means cooperative with the said first end of said cylindrical means which means prevent said cylindrical means from entering the said hole in said article; and
6. Connecting means pivotally connecting said tab means to said lever means in such manner that the said rod means is forced into said cylindrical means so as to bring the said offset means closer to the said first end of said cylindrical means when the lever means is moved in one direction and so that said offset means is moved away from said first end of said cylindrical means when the said lever means is moved in the other direction.

4,072,336
VACUUM SPOILER FOR PICKUP
Leo J. Ruzicka, 4804-19th St., Lubbock, Tex. 79407
Filed Nov. 1, 1976, Ser. No. 738,165
Int. Cl.[2] B62D *35/02*
U.S. Cl. 296—1 S **4 Claims**



1. In a pickup truck having
a. a cab with a straight back thereto, and
b. a bed with
(i) side walls and
(ii) a floor having a front next to the cab,
c. said bed adjacent the straight back of the cab, THE IMPROVED STRUCTURE FOR REDUCING FUEL CONSUMPTION AT HIGH SPEEDS, COMPRISING:
d. an elongated cross slot through the front of the bed floor to vent air from under the bed to behind the cab.

4,072,337
TRAILER CONSTRUCTION
Joseph K. Barker, Rt. 7 Box 101, Abingdon, Va. 24210
Filed Jan. 30, 1976, Ser. No. 653,904
Int. Cl.[2] B63B *35/34*
U.S. Cl. 296—27 **9 Claims**



1. A trailer vehicle comprising a base and an elongated shelter structure arranged over said base, said shelter structure comprising normally vertical rigid parallel side walls, and releasable means extending transversely of and connected between said walls at spaced points therealong for supporting said walls in vertical position, certain of said releasable means comprising transverse rafters extending across said shelter body and pivotally connected at their remote ends to the respective walls, each rafter being formed of complementary sections in end-to-end relationship centrally of the width of said body, and a splicing device connecting the adjacent ends of each rafter and releasable from at least one such end whereby each section is free to swing downwardly about its pivotal connection with said walls, each wall being pivotally connected to said base to swing downwardly and inwardly to substantially horizontal positions after said rafter sections have been swung downwardly to positions adjacent said walls.

4,072,338
OPENABLE DUAL WINDSHIELD ARRANGEMENT FOR CONSTRUCTION VEHICLES
Dean M. Lawrence, Aurora, and Fred E. Simpson, Oswego, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Filed Apr. 5, 1976, Ser. No. 673,508
Int. Cl.[2] B62D *27/00*
U.S. Cl. 296—28 C **11 Claims**

1. A dual windshield arrangement, mounted on a main frame of an operator's cab, comprising
a sub-frame having an upper end thereof pivotally mounted

in a fixed position on said main frame solely for swinging movements between closed and opened positions,

an upper windshield mounted on said sub-frame,

a lower windshield slidably mounted on said main frame and on said sub-frame for sliding movements below or in overlying relationship relative to said upper windshield whereby said upper windshield can be solely opened, said lower windshield can be solely opened or said upper and lower windshields can be opened simultaneously,

first latch means releasably attaching said sub-frame to said main frame, and

second latch means releasably attaching said lower windshield in a selected position on one of said main frame and said sub-frame.

4,072,339

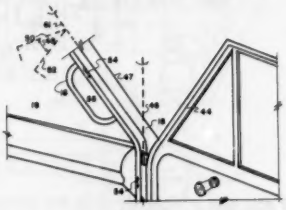
HIGH GROUND CLEARANCE PASSENGER VEHICLE HANDLE APPARATUS

Melvin Albert Rothlisberger, 721 Fifth St., Elko, Nev. 89801

Filed July 15, 1976, Ser. No. 705,676

Int. Cl.[2] B60N *3/02*

U.S. Cl. 296—71 **5 Claims**



1. In combination with a high-ground clearance passenger vehicle of the type having a door to permit entry thereinto and a functionally vertical door post cooperatively associated with said door, a handle apparatus comprised of:

a base with legs extending away from opposite ends thereof to form a 'U'-shaped handle member;

securing means to secure said handle member to said door post to extend away therefrom into the interior of said vehicle and to form a 'D'-shaped opening, said base and said legs being sized in length and section so that a hand may readily grasp said handle member;

wherein said handle member is secured to said doorpost at a point along its length to be graspable by the hand of vehicle entrant and to provide said entrant with a means when grasped, to apply a lifting force to assist said entrant in entering said vehicle; and

wherein said handle member is secured to said door post at an angle from about 25 degrees to about 65 degrees, said angle being the angle between a plane containing the legs of said handle member and a plane parallel to the door of said vehicle in a closed position.

4,072,340

WINDOW ASSEMBLY

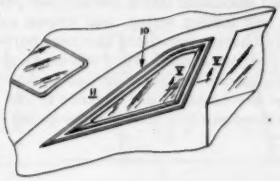
Cleon C. Morgan, Holland, Mich., assignor to Donnelly Mirrors, Inc., Holland, Mich.

Filed Sept. 20, 1976, Ser. No. 724,618

Int. Cl.[2] B60J *1/00*

U.S. Cl. 296—84 R **24 Claims**

1. A vehicular window assembly formed as a complete unit prior to installation and adapted for installation from the exterior of a vehicle body to provide an assembly for closing an opening in a vehicle body, said window assembly comprising a casing constructed of a molded plastic material approximating the shape and size of the opening in said vehicle; a transparent window having a peripheral edge with said casing molded around said peripheral edge; attachment means for attaching said casing to said vehicle body, said casing being molded around at least a first portion of said attachment means so as to embed said first portion within the casing; said casing having an inner surface arranged to face in a direction toward the inside of the vehicle body and an outer surface arranged to face in a direction toward the outside of said vehicle body; said attachment means having second portions spaced along the casing, extending in a direction toward the inside of said vehicle body, and constituting affixing means for affixing said composite casing and transparent window over said opening in the vehicle body; said casing and attachment means structure providing a finished trim around said window and the periphery of the opening in the vehicle body by which said second, affixing portions of said attachment means are concealed from view outside of the vehicle body.



4,072,341

ADJUSTABLE CHAIR

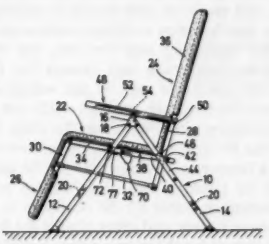
Rudolf Kurz, Bietigheim-Bissingen, Germany, assignor to Kurz GmbH, Bietigheim, Germany

Filed Dec. 1, 1975, Ser. No. 636,709

Claims priority, application Germany, Dec. 3, 1974, 7440096[U]

Int. Cl.[2] A47C *4/00*

U.S. Cl. 297—27 **17 Claims**



1. In an adjustable chair, a combination comprising a frame including a pair of lateral portions; a seat; a backrest; means for connecting said backrest to said frame for movement relative thereto through a series of first positions between an erect and an intermediate position, and through a series of second positions between said intermediate and a fully reclined position; means for arresting said backrest in selected ones of said first positions, including a first arresting member connected to said frame and a second arresting member connected to said backrest for movement therewith relative to said first arresting member, one of said arresting members having at least one detent projection and the other arresting member including an arresting portion juxtaposed with a region of movement of said detent projection relative to said arresting portion which corresponds to the movement of said backrest between said erect and intermediate positions and having a plurality of detent recesses in a selected one of which said detent projection is received to arrest said backrest in a selected first position, whereas said detent projection is outside said region in said second positions of said backrest so that the latter is infinitely adjustable between said second positions; a pair of armrests each associated with one of said lateral portions; a pivot con-

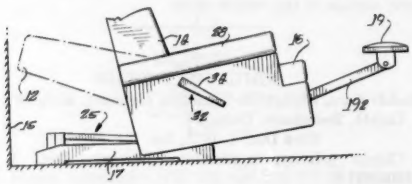
necting a respective one of said armrests to said backrest; and means accommodated in at least said one armrest and operative for damping said movement of said backrest toward said fully reclined position thereof at least in a range in which said backrest approaches said fully reclined position, said damping means including a helical tension spring having two ends one of which is attached to said pivot, and a connecting rod attached to said associated lateral portion and partially accommodated in said tension spring, said tension spring and said connecting rod having associated abutment portions which are disengaged from one another when said backrest is outside said range and engage one another when said backrest is within said range so that movement of said backrest in said range toward said fully reclined position results in tensioning of said tension spring.

4,072,342

RECLINER CHAIR

Carl B. Johnson, and Henry James, both of Pontiac, Ill., assignors to Pontiac Furniture Industries, Inc., Pontiac, Ill.

Filed Apr. 20, 1976, Ser. No. 678,702
Int. Cl.[2] A47C 1/02
U.S. Cl. 297—84 **7 Claims**



1. In a wall-clearing reclining chair comprising a base, a chair chassis movably supported by said base, a chair back on said chassis, a chair seat on said chassis, an extendible footrest on said chassis, and means on said chassis for shifting said chair back and chair seat between a sitting position and a reclined position and for extending said footrest, the improvement comprising means supporting said chassis for forward and downward travel along said base by the weight of the occupant from a rearward sitting position with the footrest retracted to a forward position at which the chair back may be reclined with the footrest extended without rearward projection of the back farther rearwardly than in said sitting position

latch means for latching said chair chassis at said sitting position, means operable by the occupant to actuate said latch means to release said chair chassis for forward shifting movement under the occupant's weight, and a biasing means activated by said forward and downward travel to return said chair chassis rearwardly to the sitting position when the occupant rises from the chair.

4,072,343

REVERSIBLE AND ADJUSTABLE BILEVEL SEAT FOR DUAL-PURPOSE VEHICLE

Gonzalo Dario Vidal Meza, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

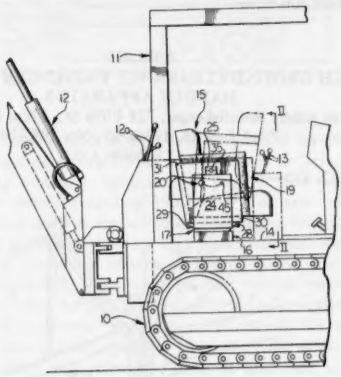
Filed Dec. 27, 1976, Ser. No. 754,784
Int. Cl.[2] A47C 1/00
U.S. Cl. 297—93 **14 Claims**

1. A reversible and adjustable seat apparatus for an operator's station of a dual-purpose vehicle having a first implement at the front and a backhoe at the rear with backhoe controls which are higher above the vehicle platform than are the first implement controls, said seat apparatus comprising, in combination:

a base fixed to the vehicle platform;

mounting means on the base comprising parallel upright side members;

a rotational assembly comprising a first transverse plate, a first cushion member secured to said first transverse plate, a second transverse plate, a second cushion member secured to said second transverse plate, parallel upright arms flanking said plates immediately adjacent the upright side members, and aligned pivots on said arms journalled in sockets in said side members to define a pivot axis on which the rotational assembly may be turned between a forwardly facing position with the first cushion member forming a seat while the second cushion member forms a backrest, and a rearwardly facing position with the second cushion member forming a seat while the first cushion member forms a backrest, said pivot axis being so located



that the seat is at a higher level in the rearwardly facing position, and being at the intersection of planes which bisect the following angles;

(a) the angle between the seating surface of the first cushion member in its forwardly facing position and in its rearwardly facing position, and

(b) the angle between the seating surface of the second cushion member in its forwardly facing position and in its rearwardly facing position;

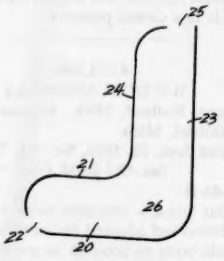
and means for selectively locking said rotational assembly to said mounting means in either of said positions.

4,072,344

CONVECTIVELY AIR-VENTILATED FURNITURE

Chou H. Li, 379 Elm Drive, Roslyn, N.Y. 11576

Filed Oct. 14, 1976, Ser. No. 713,254
Int. Cl.[2] A47C 7/72
U.S. Cl. 297—180 **16 Claims**



1. A convectively air-ventilated furniture comprising:

an elongated and hollow member having a lower end and an upper end and having also a top contact surface for the user of the furniture to rest against;

first wall means defining an air inlet opening at the lower end;

second wall means defining an air exit opening at the upper end;

third wall means defining an elongated, convective air channel extending from the air inlet opening to the air exit opening inside the hollow member;

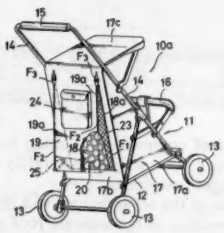
at least a major portion of the contact area between the user and the top contact surface being air impermeable but sufficiently thermally conductive so that the body heat of the user heats up the air inside the hollow member thereby, through chimney effect, initiating and maintaining in the air channel a significant convective air current directed from the air inlet opening toward the air exit opening and substantially increasing the rate of heat transfer between the user and the air inside the hollow member.

4,072,345

BABY CARRIAGE

Akiko Matsuda, Nyuzen, Japan, assignor to Yoshida Kogyo K.K., Japan

Filed Dec. 27, 1976, Ser. No. 754,519
Int. Cl.² A47C 7/36
U.S. Cl. 297—184 **2 Claims**



1. A baby carriage comprising:

(a) a frame structure;

(b) a compartment for accommodating an infant, said compartment being made of substantially air-tight materials and including a pair of side portions and a back rest provided with an opening therein;

(c) a perforated member extending over said opening;

(d) a cover for covering said opening, said cover being integral with said compartment at its upper portion of said cover and coextending with said opening;

(e) a pair of slide fastener stringers, one of which is secured to and along the marginal edges of said cover and the other stringer to and along the marginal edges of said opening, said stringers being selectively coupled and uncoupled by a slider whereby said cover is selectively closed over and removed from said opening;

(f) a pair of aerative members of a substantially triangular shape, each member being interposed between the respective marginal edges of said cover and said opening, said aerative members being attached immediately adjacent to and inside of said slide fastener stringers.

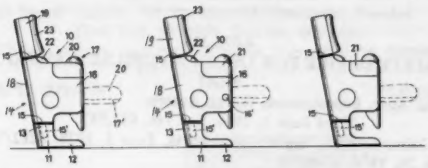
4,072,346

SEATING FURNITURE

Ralf Schueler, Gabrielenstrasse 66, 1000 Berlin 27, Germany

Filed May 14, 1975, Ser. No. 577,441
Claims priority, application Germany, May 17, 1974, 2424134
Int. Cl.² A47C 7/62
U.S. Cl. 297—217 **32 Claims**

1. A seating furniture comprising base means, right and left lateral side wall means including rear edges and lower edges, said lower edges being secured to said base means, two substantially upright column means secured to said base means and respectively to said rear edges and said lateral side wall means, seat means proper, back rest means including a first part and a second part, each of said lateral side wall means comprising a first side wall member secured to its respective column means, a second side wall member, and guide means securing said second side wall member to said first side wall member in telescoping fashion to forwardly extend said second side wall member, said guide means taking up static forces, said second part of the back rest means forming a structural unit with said



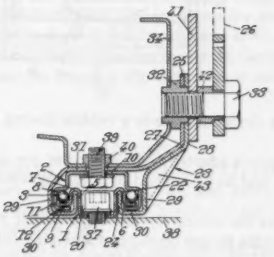
second said wall member, said column means having upper ends above said second part of said back rest means, said first part of said back rest means interconnecting said columns, journal means securing said seat means proper to said second side wall member, and electrical means in at least one of said substantially upright column means.

4,072,347

SEAT SLIDING RUNNER

Bernard Boisset, Etampes, France, assignor to Societe Industrielle Bertrand Faure Brieres-les-Scelles, Etampes, France

Filed Jan. 7, 1977, Ser. No. 757,692
Claims priority, application France, Jan. 16, 1976, 76 01115
Int. Cl.² A62B 35/00
U.S. Cl. 297—385 **9 Claims**



1. In a sliding runner supporting a motor vehicle seat, said sliding runner comprising: a lower profiled member of generally channel section having opposed flanks extended externally by respective angle section members and respective arched portions joining said angle section members to said flanks, each said angle section member having a first web extending downwardly from the corresponding arched portion and a second web extending outwardly from the bottom of the first web; means attaching said lower profiled member to the floor of the vehicle; an upper profiled member of generally inverted channel section having opposed flanks enveloping said angle section members of said lower profiled member and being extended inwardly by respective inwardly-directed ledges which extend below said outwardly extending webs of the respective angle section members of said lower profiled member; and ball races facilitating sliding of said upper profiled member along said lower profiled member and defined between each said flank of said upper profiled member and the corresponding angle section member of said lower profiled member, the improvement which comprises:

a. each said flank of said lower profiled member defining with its corresponding arched portion and first web a downwardly open inverted channel, and

b. a jaw member embracing said upper profiled member and means securing said jaw member to said upper profiled member, said jaw member having a lateral lug constituting

a lower anchoring point for a safety belt and respective walls which extend inwardly below the inwardly extending ledges of the upper profiled member and which terminate in respective turned up edges penetrating into the said downwardly open inverted channels provided by said lower profiled member.

4,072,348

SAFETY DEVICE FOR USE IN A VEHICLE HAVING A SEAT

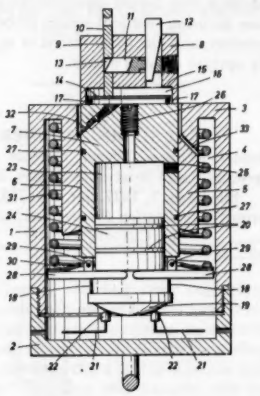
Josef Auer, Ladestrasse4, Worgl, Austria

Filed June 1, 1976, Ser. No. 691,587

Claims priority, application Austria, June 3, 1975, 4212/75; Feb. 24, 1976, 1346/76

Int. Cl.² B60R *21/10*

U.S. Cl. 297—386 **6 Claims**



1. A safety device for use in a vehicle having a seat, which comprises

(a) a safety belt adapted to be affixed at one end relative to the seat and to be applied to a person who occupies the seat,

(b) a means for releasably holding the belt in position for retaining the person on the seat when the belt is applied to the person, the releasable holding means including

(1) a control cylinder and a control piston slidably movable in the cylinder, one of said cylinder and said piston adapted to be affixed relative to the seat and the other of said cylinder and said piston adapted to be connected at one end to the other end of the belt, the piston being adapted to be pulled out of the cylinder in a predetermined direction to an enabling position in response to a tensile load on the belt in excess of a predetermined value,

(c) retaining means arranged to prevent pulling of the control piston out of the control cylinder opposite to the predetermined direction,

(d) a drive spring acting upon the retaining means and arranged to be stressed as the control piston moves out of the control cylinder against the force of the spring,

(e) a retarding mechanism adapted to perform a predetermined stroke under the action of the spring when the control cylinder and piston are in the enabling postion,

(f) piston movement limiting means constituted by rocker levers pivoted to the control piston near the other end thereof, the rocker levers having a radially inwardly extending arm and a radially outwardly extending arm, and being pivotal between an extended position, in which the outwardly extending arms extend outside the periphery of the control piston and prevent the control piston from being pulled out of the cylinder, and a retracted position, in which the levers are retracted from the periphery and permit movement of the entire control piston out of the cylinder to release the belt,

(1) the retarding mechanism comprising another piston arranged between the control piston and the rocker levers to move from a retaining position to a release position as the retarding mechanism performs the predetermined stroke so as to hold the rocker levers in the extended position when the retarding mechanism is in the retaining position and to permit the rocker levers to move to the retracted position when the retarding mechanism is in the release position.

4,072,349

STEERING OF MINING MACHINES

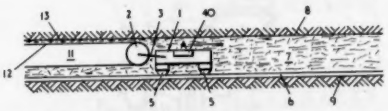
Dennis Hartley, Burton-on-Trent, England, assignor to Coal Industry (Patents) Limited, London, England

Continuation of Ser. No. 525,095, Nov. 19, 1974, abandoned. This application May 19, 1976, Ser. No. 687,761

Claims priority, application United Kingdom, Dec. 7, 1973, 56746/73

Int. Cl.² E21C *35/08*

U.S. Cl. 299—1 **18 Claims**



18. A method of controlling a cutting horizon of mineral cutter means which win a strip of mineral by separate roof and floor cutting stages comprising:

(a) cutting one of the separate roof and floor stages;

(b) cutting the other of the separate roof and floor stages;

(c) controlling the cutting horizon of one of said cutting stages by sensing the cutting horizon associated with the other cutting stage.

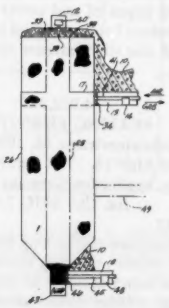
4,072,350

MULTI-STAGE METHOD OF OPERATING AN IN SITU OIL SHALE RETORT

William J. Bartel, and Robert S. Burton, III, both of Grand Junction, Colo., assignors to Occidental Oil Shale, Inc., Grand Junction, Colo.

Continuation-in-part of Ser. No. 656,391, Feb. 9, 1976, abandoned, which is a continuation of Ser. No. 538,096, Jan. 2, 1975, abandoned. This application Jan. 27, 1977, Ser. No. 762,848

Int. Cl.² E21B *43/26*; E21C *41/10*

U.S. Cl. 299—2 **28 Claims**

1. A method of processing oil shale in an in situ oil shale retort in a subterranean formation containing oil shale, said in situ retort comprising a cavity having a gas inlet, a gas outlet,

and at least one intermediate access to the cavity between the gas inlet and gas outlet and containing a fragmented permeable mass of particles containing oil shale, comprising the steps of:

establishing a processing zone in the in situ oil shale retort near the gas inlet;

during a first sate of processing introducing a processing gas to the processing zone through the gas inlet and withdrawing off gas from the cavity at such an intermediate access downstream from the processing zone for advancing the processing zone through a first portion of the fragmented mass; and

thereafter during a subsequent stage of processing introducing a processing gas to the processing zone through an intermediate access upsteam from the processing zone and withdrawing off gas from the cavity through the gas outlet for advancing the processing zone through a second portion of the fragmented mass.

4,072,351

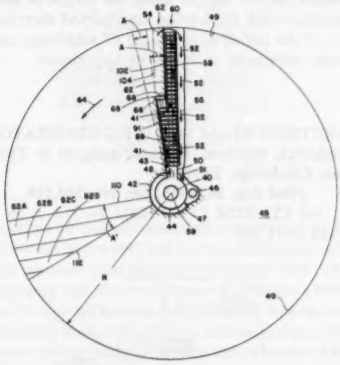
RADIAL MINING METHOD

Henry L. Roye, 801 NW. Third, Stigler, Okla. 74462

Filed Jan. 24, 1977, Ser. No. 761,797

Int. Cl.[2] E21C *41/00*

U.S. Cl. 299—11 **10 Claims**



1. A method of mining a subterranean mineral seam, for complete removal of said mineral over a selected circular area, and for minimum distance of transport of supplies and product, comprising:

(a) drilling at least a first large diameter central vertical or slope shaft, at a selected point on the surface of the earth, down to the selected seam of said mineral;

(b) enlarging said shaft at its base in said seam to a selected radius to form a workroom;

(c) drilling at least a second small diameter central shaft parallel to said first shaft adjacent said workroom;

(d) drilling a first radial shaft in said seam, from said workroom, to a selected radius R, by any conventional method, using movable roof supports such as extensible hydraulic chocks to support the roof, said chocks placed at successive radial distances from said workroom; with their extensions directed to the first wall on a first side of said first radial shaft;

(e) after said first radial shaft is complete, using a continuous mining method, directed radially, at a selected angle A to the axis of said first radial shaft, on said first side of said first shaft, drilling a second radial shaft;

(f) as said continuous miner moves radially outwardly, successively extending the extensible portion of said chocks to support the new roof area;

(g) when said second radial shaft reaches a first deflection point where said second shaft becomes as wide as the cutter of said continuous miner, changing the direction of advance of said miner to a direction parallel to that of said first shaft; whereby said first wall of said first shaft will be advanced by the width of said cutter.

4,072,352

METHOD FOR MINING OF ROCK OR ORE ACCORDING TO THE BLOCK CAVING PRINCIPLE IN MASSIVE FORMATIONS

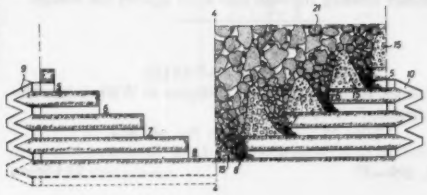
Erik Ingvar Janelid, Forsetevagen 18, Djursholm, Sweden

Filed Aug. 18, 1975, Ser. No. 605,465

Claims priority, application Sweden, Aug. 20, 1974, 7410589

Int. Cl.[2] E21C *41/00*

U.S. Cl. 299—19 **7 Claims**



1. A method for mining of rock or ore according to the block caving principle, comprising driving, at several levels, substantially straight, parallel and horizontal drifts into the lower part of a block, choosing the distance between the drifts of each level so that remaining supporting pillars will cover at least 40% of the block area, undercutting the block from the drift in such a way that the drift openings toward the undercut area and the drift coverings will be arranged in a stepped configuration, the drift openings being utilized as draw-points for the caving material, the number of drift levels being chosen with regard to desired horizontal distance along the direction of the drifts between the draw-points at adjacent levels, and further blasting down said drift coverings to retreat the draw-points if cracks and cave-ins occur in the coverings at said drift openings.

4,072,353

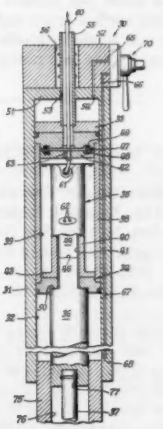
THRUST-IMPACT ROCK-SPLITTER

George B. Clark, Wheat Ridge, Colo., and Terry F. Lehnhoff, Vichy, Mo., assignors to The Curators of the University of Missouri, Columbia, Mo.

Filed Aug. 27, 1976, Ser. No. 718,115

Int. Cl.[2] E21C *37/02*

U.S. Cl. 299—22 **3 Claims**



1. A rock-splitting tool having two or more elongate pres-

sure bars and an axially driven central wedge for radially separating the pressure bars, and comprising:

a hydraulically actuated thrust servomotor having a power output shaft for providing a steady output force;

means defining a first force transmission path including an anvil connecting said power output shaft with the wedge;

an impact hammer having a housing and an internal oscillating piston adapted to impart impact forces to said anvil by the momentum of said piston thereby defining a second force transmission path through said anvil to the wedge; and

resilient means disposed between said impact hammer housing and said thrust servomotor for pre-loading said impact hammer housing through said anvil against the wedge.

4,072,354

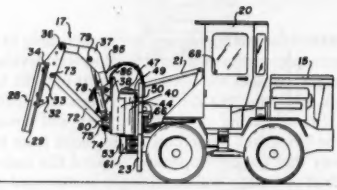
BREAKER APPARATUS

John Holmes, Richmond, Canada, assignor to William Machinery Limited, Richmond, Canada

Filed May 6, 1976, Ser. No. 683,812

Int. Cl.[2] F23J *1/06*

U.S. Cl. 299—37 **10 Claims**



1. Breaker apparatus for breaking surface crusts and the like, comprising a base adapted to be mounted on a traction unit, an elongate passive, non-pneumatic breaker bar unit comprising an elongated, fixedly mounted breaker bar having a breaker point at a lower end thereof, linkage swingably mounting the breaker bar unit on the base for substantially vertical movement, said linkage maintaining the breaker bar unit in a generally downwardly-extending attitude and comprising vertically spaced upper and lower links pivotally connected at opposite ends to the base and the breaker bar unit, a single hydraulic cylinder unit having a lower end connected to the base and an upper end connected to the upper link, and operating means for selectively supplying pressure fluid to said cylinder unit alternatively to swing the upper link up and down and consequently to raise the lower said breaker bar unit to cause said point thereof to strike surface crusts and the like therebeneath and, together with said single hydraulic cylinder unit, constituting the sole means for the said raising and lowering of said breaker bar unit.

4,072,355

FLUID SUPPLY DUCT AND PICKUP FOR MINING MACHINES

Gerald Richard Oldham Pentith, Barnsley, England, assignor to Summit Mining Ltd., Barnsley, England

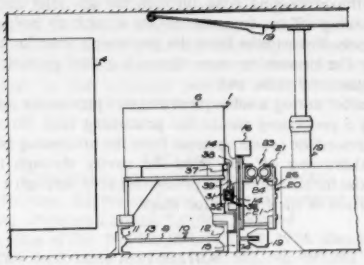
Filed July 26, 1976, Ser. No. 708,379

Claims priority, application United Kingdom, July 26, 1975, 31386/75; July 26, 1975, 31387/75

Int. Cl.[2] E21C *35/08, 35/22*

U.S. Cl. 299—43 **9 Claims**

1. A supply duct for use with mining equipment, or the like, to supply fluid to said equipment in the absence of trailing hoses in the vicinity of operation of said equipment, said supply duct comprising, in combination, an outer channel-like casing having an elongate opening formed in a wall portion thereof, an inner casing of a channel-like configuration formed for a material impervious to said fluid, and disposed within said outer casing to in effect line the inner walls thereof, said inner casing including an elongate, normally sealed slot formed therein and aligned with said elongate opening in said outer channel-like casing, said normally sealed slot being defined by opposed, resilient inner casing portions, the resiliency of which maintains said portions in engagement to seal said slot, while permiting said portions to be displaced, such as by a fluid



pickup means, to permit entry thereof to the interior of said inner casing with said resilient portions engaged about said fluid pickup means to maintain said seal, whereby said fluid pickup means may be moved along the length of said duct in communication with fluid being transported therein, without disruption of the sealed engagement of said inner casing portions, except proximate said fluid pickup means.

4,072,356

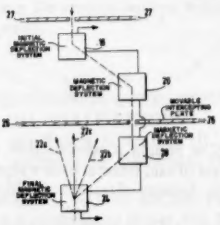
ELECTRON BEAM WELDING GENERATORS

Allan Sanderson, Balsham, England, assignor to The Welding Institute, Cambridge, England

Filed Jan. 24, 1975, Ser. No. 544,010

Int. Cl.[2] B23K *15/00;* **H01J** *37/315, 3/26*

U.S. Cl. 219—121 EB **9 Claims**



8. An electron beam generator comprising:

a housing;

an electron gun mounted within said housing;

an electron lens mounted within said housing; and

means within said housing defining a fixed path for the electron beam from the gun towards a predetermined welding point on a predetermined welding axis and blocking other paths, the path-defining means including a beam-directing means upstream of the electron lens comprising at least three electromagnetic beam-deflecting systems, including respective coils, a first of the beam deflecting systems being fixed in the housing in the direct path of the beam from the gun, and each other beam-deflecting system being fixed in the housing in the path of the beam as deflected by the preceding beam-deflecting system, the final beam deflecting system being mounted on the predetermined welding axis and the electron beam path from the final beam deflecting system to the welding point being in alignment with the electron beam path from the electron gun to the first beam deflecting system, whereby at least one of the beam-deflecting systems is off-set with respect to the said welding axis and the said path defined

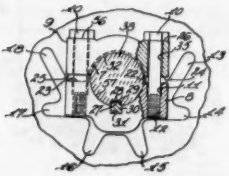
by the beam-directing means is non-linear; circuit means in which said coils of the beam-deflecting systems are connected for controlling the ratio of current passing through the coils; the generator further including intercepting means positioned between the final and first beam deflecting systems and extending across the electron beam generator to block paths between the workpiece and cathode other than the said fixed path, the intercepting means being movable to open the path from the workpiece to the electron gun for beam prealignment.

4,072,357

CLAMP STYLE WHEEL BUSHING

Kenneth N. Hansen, Waukesha, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 22, 1975, Ser. No. 643,311
Int. Cl.² B60B *37/00*
U.S. Cl. 301—1 **10 Claims**



1. A wheel and drive axle assembly comprising, a drive axle, an integral wheel and wheel hub section defining an axle opening and an arcuate axle bearing surface in said wheel hub section engaging said drive axle, means defining a rectangular key slot and a tapered keyway in said wheel hub and said axle, a key frictionally locked in said key slot and adapted for withdrawing from said keyway when said hub is loosened from said axle, reinforcing ribs between said wheel hub section and wheel extending downwardly from the wheel hub section to broaden the base and reinforce said wheel hub section, means defining counterbored and threaded holes in said wheel hub section with the counterbore on the axle engaging side of said wheel hub section, a cap hub section defining an arcuate axle bearing surface for engaging said drive axle and fastening portions in spaced relation to said wheel hub section, means defining bored holes in said cap hub section aligned with said counterbored and threaded holes in said wheel hub section, a plurality of cap screws extending through said bored holes in said cap hub section and threadedly engaging the threaded portion of the counterbored and threaded holes in said wheel hub section to thereby provide resiliance of the free length of said bolts to retain locking of said wheel on said drive axle under varying stress and thermal conditions.

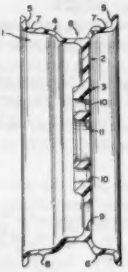
4,072,358

COMPRESSION MOLDED CUT-FIBER REINFORCED PLASTIC WHEELS

Raouf Abdul Ridha, Kent, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Apr. 28, 1976, Ser. No. 680,821
Int. Cl.² B60B *1/06*
U.S. Cl. 301—63 PW **6 Claims**

1. A compression molded cut glass fiber reinforced plastic wheel, the rim, disc and hub portions of said wheel being uniformally and predominately axially reinforced by cut glass fibers located in planes parallel to the axis of said wheel, said cut glass fibers being from ¼ inch to 1-¼ inches in length and



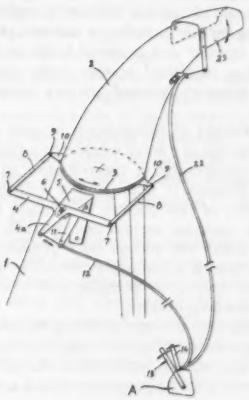
present in an amount within the range of 35% to to 75% on the weight of said plastic.

4,072,359

DEVICE FOR MANEUVERING THE DISCHARGE TUBE OF A HARVESTING MACHINE

Salomo Lillkvist, Alholmsgatan, Finland, assignor to A/S GYRO, Skive, Denmark

Filed Nov. 17, 1976, Ser. No. 742,428
Claims priority, application Finland, Nov. 21, 1975, 753291
Int. Cl.² B65G *53/40*
U.S. Cl. 302—34 **4 Claims**



1. Maneuverable discharge tube means comprising a lower duct portion, a discharge duct portion rotatably mounted on said lower duct portion, and means for rotatably maneuvering said discharge duct portion relative to said lower duct portion, said maneuvering means comprising:

a pair of ears secured to said discharge duct portion at respective opposite sides of the latter;

a bracket secured to said lower duct portion;

an elongated lever pivotally mounted on said bracket at a point on the lever intermediate the ends thereof;

a pair of elongated, rigid links,

one of said links having one of its ends pivotally connected to one end of the lever and having its other end pivotally connected to one of said ears,

the other of said links having one of its ends pivotally connected to the other end of the lever and having its other end pivotally connected to the other of said ears; and

means for rotating said lever relative to said bracket.

4,072,360

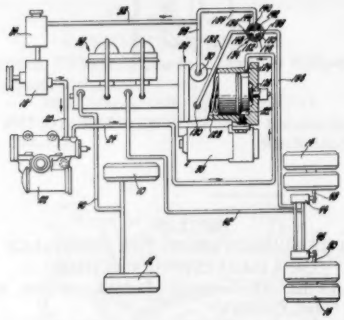
HYDRAULIC PRESSURE BRAKE SYSTEM WITH SPRING APPLY PRESSURE RELEASE PARKING BRAKE MODE

Luther E. Carroll, Dayton, Ohio, and James C. Clement, Troy, Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 689,457, May 24, 1976, abandoned. This application Feb. 16, 1977, Ser. No. 769,222

Int. Cl.[2] B60T *13/22*

U.S. Cl. 303—2 **5 Claims**



1. A hydraulic pressure brake system comprising:

a power circuit including a pressure actuated booster having a pressurizable power chamber and a hydraulic fluid outlet having a normal back pressure when hydraulic power is available in said circuit for booster operation;

a brake actuating circuit including a master cylinder powered by said booster and a wheel brake actuator, said actuator having combined service brake operator and spring apply-pressure released parking brake operator sections;

a wheel brake subject to energization by said actuator to selectively function as a service brake or a parking brake;

and control means operable in one condition to direct said normal back pressure to said actuator without requiring power actuation of said booster to pressure release said parking brake operator section and operable in another condition to dump the normal back pressure from said actuator to actuate a spring apply portion of said parking brake operator section to energize said wheel brake to function as a parking brake;

said service brake operator section being actuated by pressure from said master cylinder to apply and release said wheel brake as a service brake when said parking brake operator section is in the pressure released condition.

4,072,361

VALVE DEVICES FOR USE IN LIQUID PRESSURE BRAKING SYSTEMS OF VEHICLES

Eric Charles Hales, Leamington Spa, England, assignor to Automotive Products Limited, Warwickshire, England

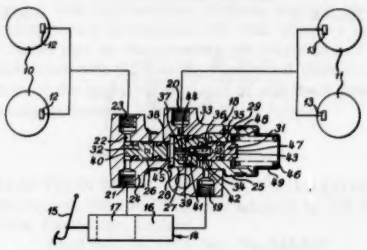
Filed Nov. 10, 1975, Ser. No. 630,288

Claims priority, application United Kingdom, Nov. 11, 1974, 48739/74

Int. Cl.[2] B60T *8/18, 8/26*

U.S. Cl. 303—6 C **4 Claims**

2. A valve device for use in a liquid pressure vehicle braking system which has two sub-systems, comprising a housing having a stepped cavity closed at one end and opened at the other end, biasing means, a stepped plunger mounted within said cavity and arranged when the valve device is mounted in a braking system so that liquid pressure in said braking system exerts a force on the stepped plunger which is opposed by said biasing means, a passage in said housing, a valve member, said biasing means engaging said plunger and tending to move same to permit said valve member to open said passage to bypass said plunger, said cavity having a central portion of uniform cross-section between two end portions, each end portion of the cavity having a uniform cross-section and being smaller in cross-sectional area than is the central portion of the cavity, the stepped plunger comprises a plunger assembly located within said cavity and having three lands, a central one of the three lands being slidably fitted within the central cavity portion and each of the other two lands being slidably fitted within a respective one of the two end cavity portions, said housing having a first port which opens into the closed end portion of the cavity and which is for connection into a first of the two sub-systems when the valve device is mounted in a braking system, second and third ports in said housing opening into the central cavity portion with one on each side of the central plunger land and being for connection into the second of the two sub-systems when the valve device is mounted in a braking system, the by-pass passage being formed in said plunger assembly and connecting the part of the central cavity portion



that is on one side of the central plunger land to the part of the central cavity portion that is on the opposite side of the central plunger land, the said valve member being a one-way valve in said passage, and abutment means in said housing co-operating with a stop surface provided in said cavity to hold said one-way valve open for certain positions of the plunger assembly within the cavity, the end of the plunger assembly remote from the closed end of the cavity being adapted to be acted upon by said biasing means when the valve device is mounted in a liquid pressure vehicle braking system so that the biasing means urges the plunger assembly towards the closed end of the cavity and the abutment means being so arranged that the one-way valve is opened as the plunger assembly approaches that end of the cavity, said plunger assembly comprising two plunger components which are coupled together, the central land and one of the other two lands being formed as one of the plunger components and the other land being formed as the other plunger component, said two plunger components being interconnected by a transverse pin.

4,072,362

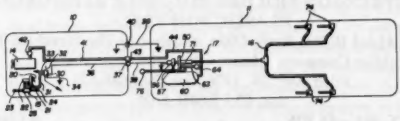
TRAILER BRAKE SYSTEM

John A. Van Anrooy, St. Joseph, Mich., assignor to Lambert Brake Corporation, St. Joseph, Mich.

Filed June 14, 1976, Ser. No. 696,048

Int. Cl.[2] B60T *13/68*

U.S. Cl. 303—7 **36 Claims**



30. A brake system for a towing vehicle and trailer, comprising a towing vehicle fluid brake system, an electromechanical transducer connected to the towing vehicle fluid brake system

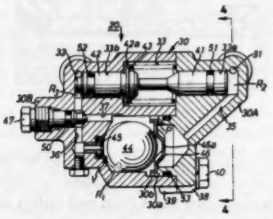
for developing an electrical signal which varies proportionately in accordance with fluid pressure experienced in the towing vehicle brake system, a trailer fluid brake system, a power booster for energizing the trailer brake system, continuously energized fluid pressure supply means for creating a given absolute fluid pressure in the power booster, and an electromagnetic control electrically connected to the transducer and mechanically connected to the power booster for proportionately varying the fluid pressure and consequent braking action in the trailer brake system in accordance with the variation in the electrical signal.

4,072,363

INERTIA-CONTROLLED VALVE FOR VEHICLE BRAKING SYSTEMS

Nogami Tomoyuki, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Feb. 7, 1977, Ser. No. 766,532
Claims priority, application Japan, Aug. 10, 1976, 51-95063
Int. Cl.[2] B60T *8/14*
U.S. Cl. 303—24 C **5 Claims**



1. In a fluid pressure control device for a vehicle braking system incorporating between a master cylinder and a wheel brake cylinder, which comprises a housing adapted to be fixedly mounted at an inclined angle on a vehicle body frame, said housing being provided thereon with an inlet port for connection to said master cylinder and an outlet port for connection to said wheel brake cylinder and being provided therein with a stepped bore in communication with said inlet and outlet ports respectively at the small and large diameter portions thereof and a first fluid chamber provided in parallel with said stepped bore and in communication with the small and large diameter portions of said stepped bore at both sides thereof; a differential piston slidably disposed within said stepped bore to provide second and third fluid chambers respectively in open communication with said inlet and outlet ports, the smaller end of said piston being exposed in said second chamber and the larger end in said third chamber; a spring loading said piston axially in a direction toward said outlet port; and a cut-off valve including a valve seat provided on the side wall of said first chamber to permit fluid flow between said second and third fluid chambers and an inertia-controlled ball housed within said first chamber to co-operate with said valve seat and rolling toward said valve seat on the inclined bottom surface of said first chamber to cut-off fluid flow from said second chamber to said third chamber when said ball is subjected to a deceleration in excess of a predetermined value;

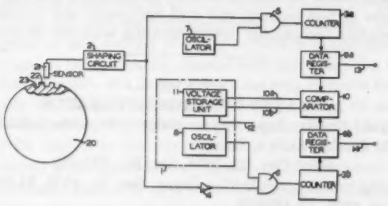
the improvement wherein said inlet and outlet ports are arranged to be located at the upper portion of said housing when mounted on the vehicle body frame and directly connected to the small and large diameter portions of said stepped bore respectively and wherein a bypass passage is provided to permit fluid flow from the upper portion of said first fluid chamber toward said outlet port and a fluid blocking means is disposed within said bypass passage to normally close said bypass passage, said fluid blocking means being adjusted to open said bypass passage only when brake fluid is supplied into said vehicle braking system.

4,072,364

COMPENSATING CIRCUIT ARRANGEMENT IN A WHEEL ANTI-SKID BRAKE CONTROL SYSTEM TO OBTAIN CORRESPONDING MEASURED VALUES OF THE DURATION OF THE HALF CYCLE ALTERNATIONS OF A WHEEL GENERATED VOLTAGE

Wolfgang Gudat, and Gerhard Ruhnau, both of Hannover, Germany, assignors to WABCO Westinghouse GmbH, Hannover, Germany

Filed Oct. 18, 1976, Ser. No. 733,424
Claims priority, application Germany, Nov. 29, 1975, 2553806
Int. Cl.[2] B60T *8/02*
U.S. Cl. 303—95 **8 Claims**



1. In an anti-skid brake control system for a wheeled vehicle, an electronic circuit for generating a wheel speed signal in accordance with the time duration of a half cycle of a sinusoidal waveform whose positive and negative alternations are provided by a sensor that detects the presence or absence of a tooth of a rotor that revolves with a wheel of the vehicle, said electronic circuit comprising:

(a) timing means subject to said sinusoidal waveform for providing a time signal representative of the time duration of a respective one of said positive and negative alternations of said sinusoidal waveform;

(b) comparator means for detecting a difference between said time signal of a positive alternation and said time signal of a negative alternation of said sinusoidal waveform; and

(c) compensating means for regulating said timing means so as to modify said time signal corresponding to one of said positive and negative alternations of said sinusoidal waveform when said comparator means detects a difference therebetween, whereby said wheel speed signal generated during a positive half cycle and a negative half cycle of said sinusoidal waveform are in correspondence for any given velocity of wheel rotation.

4,072,365

MODULATOR FOR AN ADAPTIVE BRAKING SYSTEM

Edward M. Pauwels, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Filed Apr. 5, 1977, Ser. No. 784,903
Int. Cl.[2] B60T *8/02*
U.S. Cl. 303—115 **11 Claims**

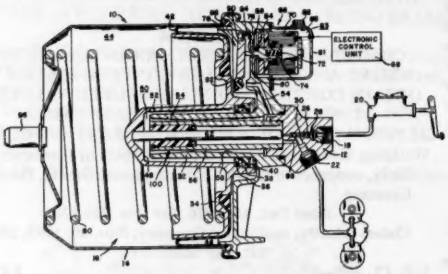
10. A modulator for an adaptive braking system comprising:

a housing defining a chamber therewithin and having an inlet, an outlet and valve means for regulating fluid communication between the inlet and outlet;

a pressure responsive member movable within said chamber to form a pair of variable volume cavities within said housing, said cavities communicating with each other via a passage within said housing; and

a sensing means cooperating with the passage and an output

of a controller for the adaptive braking system in order to open and close communication through the passage;



said pressure responsive member sealingly engaging a portion of said housing and said portion of said housing including the passage communicating with the cavities.

4,072,366

ANTI-SKID CONTROL APPARATUS

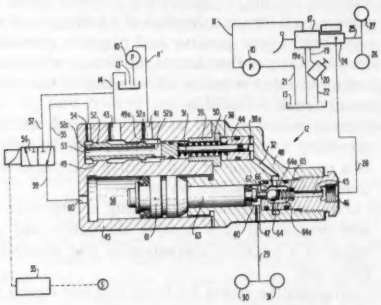
Toshiyuki Kondo, Anjo, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Dec. 22, 1976, Ser. No. 753,442

Claims priority, application Japan, Dec. 31, 1975, 51-158547; Dec. 31, 1975, 51-158549

Int. Cl.[2] B60T *8/10*

U.S. Cl. 303—116 **15 Claims**



1. In a hydraulic braking system for an engine-driven vehicle having front and rear wheel brakes, brake energization means including a master cylinder interconnected with said front rear wheel brakes and operable to effect pressurization thereof, and a cut-off valve between said master cylinder and said rear wheel brakes and operable to interrupt pressurization of said rear wheel brakes in response to a signal indicating a skid condition; the improvement which comprises pressure responsive means operably engaging said cut-off valve an acted upon by fluid pressure from said master cylinder, an engine driven fluid pressure source acting on said pressure responsive means in opposition to said master cylinder pressure and normally operable to hold said cut-off valve open, pressure control means between said fluid pressure source and said pressure responsive means and including means developing a predetermined minimum pressure in said fluid pressure source, said pressure control means including a housing having a bore, a control piston slidably disposed in said bore, means interconnecting said pressure control means and said brake energization means to vary the pressure from said fluid pressure source to said pressure responsive means in response to change in pressure developed by said brake energization means, said interconnecting means including a second piston slidable in a second bore and aligned with said control piston, said second piston being movable towards the control piston by pressure developed by said brake energization means, a compression spring caged between said control piston and said second piston, a control valve operable in response to a signal indicating a skid condition at said rear wheels to lower the pressure from said fluid pressure source to said pressure responsive means to close said cut-off valve and interrupt pressurization of said rear wheel brakes.

4,072,367

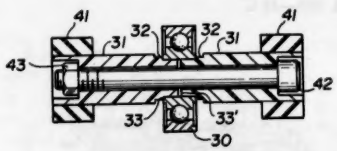
NOISE REDUCING INSERTS FOR SPINDLE TAPE IDLERS

Joe Johnson, Jr., Powder Springs, Ga., assignor to Coats & Clark Inc., Stamford, Conn.

Filed Nov. 24, 1976, Ser. No. 744,714

Int. Cl.[2] F16C *35/04*

U.S. Cl. 308—18 **8 Claims**



1. A tape idler pulley assembly adapted to be supported in open mounting slots, comprising a pulley, a rolling bearing having a radially outer race press fit in said pulley and an inner race, a pair of plastic rods having first ends close fitted in the inner race of said bearing from opposite sides thereof, and a pair of resilient sleeves close fit around the other ends of said rods, said sleeves having a diameter requiring deformation thereof for insertion in said mounting slots.

4,072,368

SLIDING-SURFACE BEARING AND PROCESS OF MANUFACTURING THE SAME

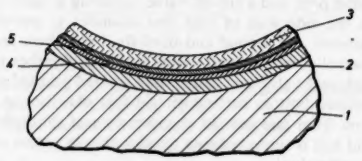
Otto Ehrentraut, Gmuden, Austria, assignor to Miba Gleitlager Aktiengesellschaft, Laakirchen, Austria

Filed Sept. 17, 1976, Ser. No. 724,397

Claims priority, application Austria, Sept. 24, 1975, 7329/75

Int. Cl.[2] F16C *17/00*

U.S. Cl. 308—3 R **13 Claims**



1. A sliding-surface bearing which comprises

a bearing metal layer,

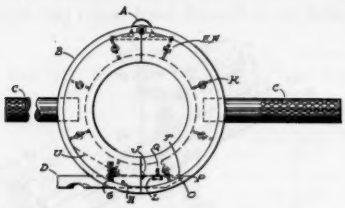
a sliding-surface layer consisting of a lead alloy which contains copper and tin, and

an additional layer which is disposed between said bearing metal layer and said sliding-surface layer and adjoins the latter and consists of a lead-copper alloy which is initially free from tin.

4,072,369
DRILL PIPE STABBING PROTECTOR

Salvador J. Segreto, 6300 Gillen St., Metairie, La. 70003

Filed Nov. 4, 1976, Ser. No. 738,667
Int. Cl.[2] F16C 1/26, 29/00
U.S. Cl. 308—4 A 9 Claims



1. A stabbing protector device embodying apparatus for use in oil well drilling operations which requires the continuous addition of pipe to another in the formation of drill pipe strings, which comprises the combination of:

a tubular metal member constituted of two sections which, when alternately disposed parallel mating surfaces are fitted together, form a body of generally cylindrical shape having an aperture axially therethrough,

hinge means located at one of the alternately disposed mating surfaces which connect and hold the two sections of the tubular member in permanent pivotal relationship, one section relative to the other section of the body.

locking means located at the other of the alternately disposed mating surfaces by virtue of which the two sections constituting the body of the tubular body can be brought together and locked,

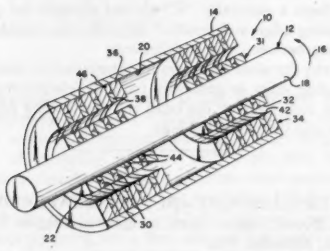
a handle located on each of the two sections of the tubular member constituting the body,

a replaceable split-ring of a resilient materials, segments of which are located on the upper face of each of the two tubular metal sections of the body to provide a protective head member.

4,072,370
RADIAL MAGNETIC BEARING

Ken G. Wasson, Aptos, Calif., assignor to Spectra-Flux, Inc., Watsonville, Calif.

Filed Aug. 24, 1976, Ser. No. 717,257
Int. Cl.[2] F16C 32/04
U.S. Cl. 308—10 11 Claims



1. A radial magnetic bearing comprising:

a shaft having a circumferential surface and a housing having an inner cylindrical surface substantially centered about and spaced from said circumferential surface;

a first plurality of axially magnetized ring magnets secured to said circumferential surface of said shaft and being axially terminated in faces for defining magnetic poles, in which like poles of adjacent ones of said magnets face one another, said like pole faces of said adjacent magnets being spaced apart from one another for defining means for defining a configuration of openings;

a first plurality of ferro-magnetic rings positioned in said openings means and secured to said pole faces, for providing a flux path tangential to said circumferential surface for thereby smoothing out any non-uniform magnetization of said magnets;

a first plurality of radially magnetized ring magnets positioned radially adjacent said first plurality of ferro-magnetic rings;

a second plurality of axially magnetized ring magnets secured to said inner cylindrical surface of said housing and being axially terminated in faces for defining magnetic poles, in which like poles of adjacent ones of said magnets face one another, said like pole faces of said adjacent magnets being spaced apart from one another for defining means for defining a configuration of openings, said like poles of said second plurality of axially magnetized ring magnets being radially aligned with said like poles of said first plurality of axially magnetized ring magnets for radially repelling said first and second plurality of magnets from one another and thereby for centering of said shaft with respect to said housing;

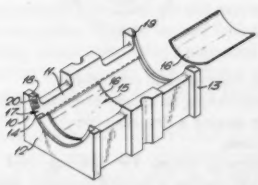
a second plurality of ferro-magnetic rings positioned in said openings means of said second plurality of magnets and secured to said pole faces thereof, for providing a flux path tangential to said inner cylindrical surface for thereby smoothing out any non-uniform magnetization of said second plurality of said magnets; and

a second plurality of readially magnetized ring magnets positioned radially adjacent said second plurality of ferro-magnetic rings.

4,072,371
BEARINGS FOR RAILWAY VEHICLE AXLES

Joseph Henry Hill, Greenford, and David Frederick Green, Maidenhead, both of England, assignors to Vandervell Products Limited, England

Filed May 6, 1976, Ser. No. 683,969
Int. Cl.[2] F16C 33/04
U.S. Cl. 308—56 16 Claims



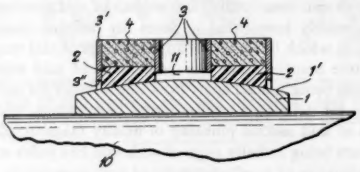
1. A bearing for a vehicle axle comprising a metal block having a part cylindrical recess extending along one face of the block between opposed end faces of the block, a journal bearing lining extending along said recess to support the vehicle axle for rotation, the end faces of the block having convexly radiussed corners merging with said part cylindrical recess and the surface of each corner having indents to provide pits for receiving lubricant.

4,072,372

HEAVY-DUTY SWIVEL BEARING

Heinz Korrenn, Obbach; Wolfgang Teich, Schweinfurt, and Helmut Heimrich, Sennfeld, all of Germany, assignors to Kugelfischer Georg Schafer & Co., Schweinfurt, Germany

Filed Nov. 11, 1976, Ser. No. 741,126
Claims priority, application Germany, Nov. 12, 1975, 2550791
Int. Cl.[2] F16C *23/04, 33/10*
U.S. Cl. 308—72 15 Claims



9. A swivelable journal bearing for a shaft, comprising:

a shaft-supported inner ring with a spherically convex outer surface;

an outer annular body divided into a multiplicity of socket elements rigidly welded to one another, said body coaxially surrounding said ring with clearance, each of said socket elements being formed with at least one throughgoing aperture facing said ring;

a low-friction insert in each aperture projecting into said clearance, said insert having a spherically concave face in contact with and conforming to said outer surface; and

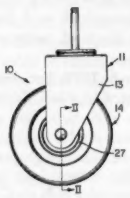
a plug of a hardenable substance in each aperture back-stopping the insert thereof.

4,072,373

WHEEL CONSTRUCTION

John W. Black, Hickory Corners, Mich., assignor to Pemco-Kalamazoo, Inc., Kalamazoo, Mich.

Filed Sept. 16, 1976, Ser. No. 723,927
Int. Cl.[2] F16C *33/00*
U.S. Cl. 308—191 15 Claims



1. A wheel construction, comprising:

wheel means having an axially extending hole therethrough, said hole having a first diameter;

bearing means;

bearing housing means for housing said bearing means therein and having a second diameter less than said first diameter, said bearing housing means being located inside said hole with the center of said bearing housing means being concentric with the outside diameter of said wheel means, the difference between said first and second diameters defining a spacing therebetween;

a moldable, synthetic resin material filling said spacing; and

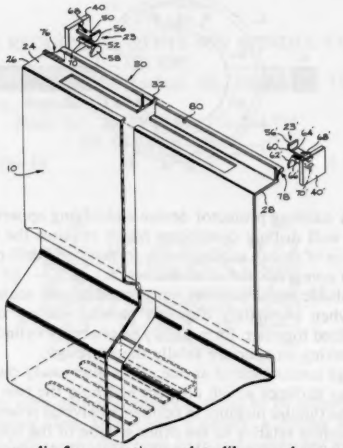
means for positively securing said moldable, elastomeric material in said spacing to effect a securement of said bearing housing means to said wheel means.

4,072,374

SIDE FASTENER CLIP FOR A PLATE-LIKE MEMBER

Howard D. F. True, Jr., Fern Creek, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Sept. 27, 1976, Ser. No. 726,827
Int. Cl.[2] A47B *96/06;* A44B *21/00*
U.S. Cl. 312—214 6 Claims



1. A fastener clip for mounting a plate-like member to a side wall, the plate-like member having a side edge to be held generally adjacent the side wall and a a beaded leading edge perpendicular to the side edge, the plate-like member also including means for preventing further forward movement beyond an installed position, said fastener clip comprising:

a base member adapted for secure mounting to the side wall;

a pair of spaced resilient parallel legs projecting outwardly from said base member generally perpendicularly to the side wall, the gap between said parallel legs being generally parallel to the installed position of the leading edge of the plate-like member;

said parallel legs being spaced sufficiently far to receive the thickness of the plate-like member and sufficiently close to require deforming of said parallel legs to permit passage of the bead on the leading edge of the plate-like member; and

a head formed on the end of each leg and extending generally away from the gap between said legs, each of said heads having at least a first inclined surface with said first inclined surfaces oriented with respect to each other so as to form a generally "V" shaped channel for guiding the leading edge and bead of the plate-like member into the space between said parallel legs;

whereby the plate-like member is installed by positioning the leading edge in generally parallel relationship with said legs and inserting the bead and the leading edge through the gap between said legs.

4,072,375

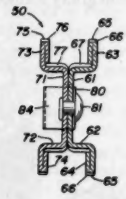
DRAWER SLIDE ASSEMBLY WITH TAPERED RUNNER

Jack L. Boone, Algona, Iowa, assignor to Snap-on Tools Corporation, Kenosha, Wis.

Filed May 9, 1977, Ser. No. 795,264
Int. Cl.[2] A47B *88/00*
U.S. Cl. 312—338 10 Claims

1. A drawer slide assembly for slidably mounting a drawer in a cabinet, said slide assembly comprising a first elongated track member adapted to be mounted in use substantially horizontally on the inside of the associated cabinet and having a first elongated support portion, a second elongated track member adapted to be mounted in use substantially horizontally on the outside of the associated drawer and having a second elon-

gated support portion, and an elongated runner having first and second support arms respectively extending laterally in opposite directions and respectively provided with longitudinally extending and substantially parallel lower and upper bearing surfaces, each of said lower and upper bearing surfaces having inclined end portions terminating at end corners at the opposite ends thereof so that said inclined end portions of said lower bearing surface respectively converge with said inclined end portions of said upper bearing surface toward the adjacent ends thereof, said runner being disposed in use between said



first and second track members with said lower bearing surface being supported upon said first support portion in longitudinal sliding engagement therewith and with said second support portion being supported upon said upper bearing surface in longitudinally sliding engagement therewith thereby slidably to support the associated drawer on the associated cabinet, whereby said end corners of said lower and upper bearing surfaces are disposed in use out of engagement with said first and second support portions thereby to prevent snagging thereof.

4,072,376

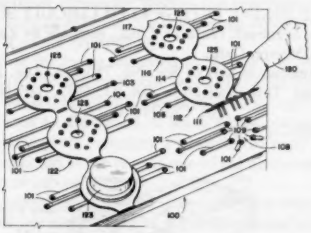
SOCKET ASSEMBLIES

Suel Grant Shannon, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 422,489, Dec. 6, 1974, abandoned. This application Dec. 18, 1974, Ser. No. 534,113

Int. Cl.[2] H01R *13/48*

U.S. Cl. 339—17 C **7 Claims**



1. An assembly of connected socket assemblies mounted upon predetermined patterns of holes in a substrate, each constructed to receive a component and each comprising:

a wafer of insulative material with a plurality of holes formed therethrough in said predetermined pattern;

a plurality of sockets having an open ended tubular portion individually positioned in said holes with said open end of said sockets being on a first side of said wafer and the tubular portion of said sockets extending through said wafer;

said tubular portions of said sockets constructed to contact fit within the holes in said substrate;

flexible connecting means connected between adjacent ones of said socket assemblies and being of a length to separate adjacent wafers a distance equal to the distance between adjacent patterns of holes to enable mounting of at least two of said socket assemblies upon said substrate with the tubular portions of the sockets of a given wafer, while being mounted, being aligned with the predetermined pattern of holes by the established alignment of said tubular portions of said sockets of the adjacent wafer which was mounted immediately preceding the mounting of said given wafer.

4,072,377

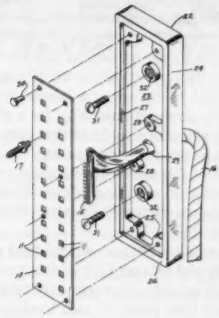
TERMINAL BLOCK

Harley J. Van de Loo, Milwaukee, and Hans J. Ziegler, Whitefish Bay, both of Wis., assignors to Utility Products Co., Milwaukee, Wis.

Filed May 10, 1976, Ser. No. 684,884

Int. Cl.[2] H05K *1/10*

U.S. Cl. 339—17 F **2 Claims**



1. A terminal block comprising:

a rigid support board having a plurality of spaced apertures therein;

a plurality of separate printed circuit conductive paths disposed on one side of said board, each conductive path including a terminal area aligned with one of said apertures and a terminus area, the terminus areas of the conductive paths being grouped together;

a terminal extending through each aperture and projecting outwardly from the opposite side of said board, each terminal including a shoulder intermediate its ends and adapted to rest against the surface of said opposite side of said board, and

a hollow cylindrical mounting end adapted to be received in one of said apertures and to be deformed to physically restrain the terminal on said board against withdrawal and to physically and electrically engage said terminal with said terminal area of the respective conductive path;

cooperating means on each terminal and said board locking said terminals against rotation on said board,

said cooperating means comprising a mounting portion with a polygonal cross section on each terminal and a polygonal shape formed at each aperture to receive and mate with said mounting portion;

a cable carrying conductors each of which is connected to a terminus area of a respective conductive path; and

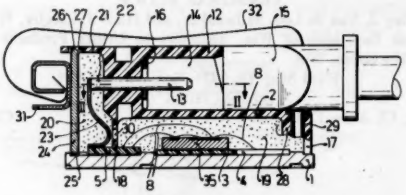
a box-like shell having a back wall, an upstanding rim extending about the entire periphery of said back wall, one open side and a cable opening,

said board being supported on said shell at the rim to close said open side and with the surface of said one side of said board facing the interior of said shell so as to provide a space between said one side of said board and the opposing surface of said back wall, and said cable extending through said cable opening.

4,072,378
PROTECTIVELY COVERED MOUNTING FOR A PLUG-IN ELECTRONIC APPARATUS OF A MOTOR VEHICLE

Eduard Lockbrunner, Hemmingen, and Dietmar Schnepf, Esslingen, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Dec. 2, 1978, Ser. No. 746,709
Claims priority, application Germany, Dec. 5, 1975, 2554747
Int. Cl.[2] H05K *7/10;* **H01R** *13/50*
U.S. Cl. 339—17 C **9 Claims**



1. A protectively covered mounting for a plug-in electronic control apparatus of a motor vehicle that comprises electronic components, which mounting comprises:

a base plate (1) of thermally conducting material on which said electronic components (3,4) are fixedly mounted;

a conductor pattern plate (5) likewise fixedly mounted on said base plate (1);

a cover (2) covering a portion of said base plate (1) so as to form first (19) and second (20) wiring cavities on opposite sides of a wall of said cover which is substantially perpendicular to said base plate (1) and having plug connectors (13,22) held therein and also a recess for accepting a mating connector (15) insertable into said recess from outside of said cover, said recess having no part thereof adjacent to said base plate (1), said plug connectors having their control apparatus ends extending into said second wiring cavity (20) and their other ends extending into said recess (14);

electronic components on said base plate in said first wiring cavity, and--.

a cover plate (24) removably covering said second wiring cavity with one edge of said cover plate adjacent to said base plate (1) and the other edges thereof adjacent to walls of said cover (2).

4,072,379
ELECTRIC POWER DISTRIBUTING APPARATUS

Gary L. Towne; Noel F. Depew, and Charles A. Fowler, all of Wichita, Kans., assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 13, 1976, Ser. No. 750,334
Int. Cl.[2] H05K *1/07*
U.S. Cl. 339—17 LM **5 Claims**

1. An electric distributing apparatus comprising:

a housing having a plurality of conductors therein;

a module for providing an electrical connection between selected ones of said conductors and a circuit member having electrical contacts thereon;

means for securing said module to said housing;

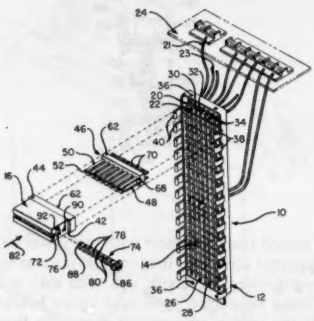
said module having an opening therein to receive said circuit member and comprising:

conductor means having first and second ends, said first ends forming an electrical connection with selected ones of said conductors when said module is secured to said housing; said second ends contacting said electrical contacts on said circuit member to form an electrical connection therebetween when said circuit member is operatively inserted in said opening in said module;

said module having means thereon to move said second ends of said conductor means out of contact with said electrical contacts on said circuit member to enable said circuit member to be inserted or removed from said opening in said module;

said conductors being made of a conductive metal and said first ends of said conductor means being shaped to form an interference fit with the associated said conductors to thereby cut into the surfaces of said conductors when forming said electrical connection therewith;

said conductors having first portions thereof positioned in spaced parallel relationship in said housing and also having second portions integrally formed with the associated



said first portions and which said second portions extend out of said housing for a direct connection to a power source means; and

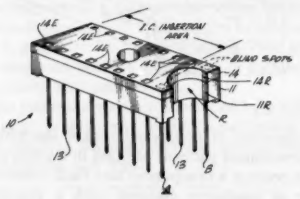
said first portions of said conductors having predetermined varying lengths so as to afford a selection of said conductors to which said first ends of said conductor means are connected when said module is secured to said housing;

said conductor means being positioned in said module so as to be perpendicular to said first portions of said conductors when said module is secured to said housing.

4,072,380
DUAL INLINE INTEGRATED CIRCUIT SOCKET

Eugene G. Freehauf, Ontario, Calif., assignor to Zero Corporation, El Monte, Calif.

Continuation-in-part of Ser. No. 716,113, Aug. 20, 1976, abandoned. This application Jan. 17, 1977, Ser. No. 759,748
Int. Cl.[2] H05K *1/12*
U.S. Cl. 339—17 CF **12 Claims**



1. An improved socket for receiving the leads of a dual inline integrated circuit package or the like pluggable unit comprising:

an insulative body having a plurality of longitudinally spaced apart socket apertures extending through the body and arranged adjacent opposite longitudinal edges of the body in parallel aligned rows, the spacing between each of the sockets in said rows being substantially the same,

a plurality of electrical conducting contacts having a female socket portion constructed and defined at one end and a male terminal extending therefrom, the contacts being

mounted and held in each of the socket apertures with the male terminals extending outwardly from one side of the insulative body, and

an insulative cap member having a preselected lengh with a plurality of longitudinally spaced apart entry apertures constructed and defined to extend through the cap member and arranged in aligned parallel rows adjacent opposite edges of the cap member, the cap member being secured to the insulative body with each of the entry apertures mounted in vertical alignment with the corresponding female socket portions, the number of entry apertures defined in the cap member being less than the number of socket apertures containing female socket portions in the insulative body but permitting the leads of an integrated circuit package or the like pluggable unit to be mounted into the entry apertures of the cap member in an electrical conducting relationship with the electrical contacts.

4,072,381

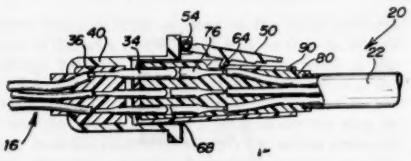
TRACTOR-TRAILER ELECTRICAL CONNECTOR SYSTEM

James G. Burkhart, Dallas; Montgomery P. Burkhart, Rockwall, and James D. Coley, Rickwall, all of Tex., assignors to Air-Tex Wire Harness, Inc., Garland, Tex.

Continuation-in-part of Ser. No. 568,922, April 17, 1975, abandoned. This application Nov. 1, 1976, Ser. No. 737,678

Int. Cl.[2] H01R *13/44, 13/52*

U.S. Cl. 339—29 R **3 Claims**



1. An electrical connector system for supplying electrical power from electrical wires in a tractor cab vehicle to electrical wires in a trailer comprising:

a first socket for being mounted to the tractor cab and for being wired to the electrical wires of the tractor cab,

a second socket for being mounted in the trailer and for being wired to the electrical wires of the trailer,

each of said sockets including a plurality of male terminals each connected at the rear to one of the electrical wires in the tractor cab or trailer,

means for supporting said male terminals such that said male terminals are maintained at a predetermined orientation within each of said sockets,

means for insulating said male terminals from one another and for insulating said male terminals from an external environment,

each of said sockets having a circular aperture encompassing the forward ends of said male terminals and terminating in a rear face portion within said socket,

each of said sockets including flanges for attachment to a wall of the tractor cab or trailer,

an insulated cable having a predetermined length with a plurality of electrical cable wires extending therethrough to extend between said first and second sockets when attached to the trailer and the tractor cab,

first and second identical plugs integrally molded to opposite ends of said cable such that said plugs and insulated cable comprise an integral unitary member of a length to extend between said sockets mounted on the tractor cab or trailer,

each of said plugs including a plurality of female terminals dimensioned and oriented for mating with said male terminals of either of said sockets and each female terminal connected at the rear of one of said plurality of cable wires within said cable,

each of said plugs further having an elastomeric plug core surrounding the rear portion of said female terminals and portions of said plurality of cable wires, such that said female terminals are maintained at a predetermined orientation for mating with said male terminals and wherein the connections between said female terminals and said plurality of cable wires are covered and insulated,

each of said plug cores having outwardly extending wings,

each of said plug cores having a front face portion including a plurality of apertures for receiving the open ends of said female terminals,

each of said plug cores further having a rear face portion including an aperture to permit said cable to extend from said plug cores,

a pair of cylindrical shaped plug housings having first and second ends, fabricated from generally rigid synthetic polymer formed integrally and circumferentially about said plug cores and including outwardly extending wings formed integrally about said plug core outwardly extending wings for enabling removal of said plugs from said sprockets,

said first end of each of said plug housing having a diameter approximately equal to the diameter of said plug core front face portion and including apertures mating with said apertures in said plug core,

said first ends of said plug housings having diameters dimensioned to be closely received within said circular apertures within said sockets and to be disposed adjacent said rear face of said sockets, wherein a watertight electrical connection may be made between the tractor cab and the trailer, and

said second ends of said plug housings having diameters approximately equal to the diameter of said plug core rear face aperture and formed integrally with said plug core rear face portions to thereby provide a strain relief for said insulated cable and a watertight seal between said insulated cable and said plug cores.

4,072,382

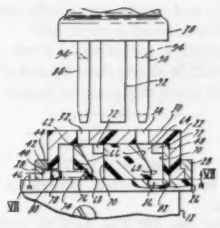
SAFETY OUTLET

Kurt W. Reschke, 21515 Thorofare, Grosse Ile, Mich. 48138

Filed June 2, 1976, Ser. No. 691,979

Int. Cl.[2] H01R *13/44*

U.S. Cl. 339—40 **14 Claims**



1. A safety outlet comprising:

a housing having electrical contacts disposed therein adapted to engage the prongs of a plug;

a cover member secured to said housing and having apertures disposed therein adapted to allow said prongs to pass through said cover member to engage said contacts; and

a rotatable member movably secured to said cover member, said rotatable member having apertures therein adapted to receive said prongs and further having means provided thereon engaging said cover member to prevent rotation thereof when said rotatable member is in a first predetermined position, said means being adapted to be released in response to the insertion of said prongs in said apertures of

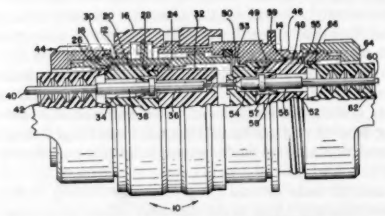
said rotatable member, whereby said rotatable member may be rotated from said first predetermined position in which access to said apertures of said cover member is effectively blocked by said rotatable member to a position in which said apertures are aligned, thereby allowing said prongs to pass through said cover member apertures and engage said contacts, said rotatable member further including a slidable member disposed within said rotatable member, said slidable member being adapted to cooperate with said cover member to limit the rotation of said rotatable member.

4,072,383

ELECTRICAL CONNECTOR INSERT RETENTION ASSEMBLY

John Keith Cameron, Hillside, and Ronald Francis Krolak, North Riverside, both of Ill., assignors to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Dec. 24, 1975, Ser. No. 644,348
Int. Cl.[2] H01R *13/48*
U.S. Cl. 339—59 R **31 Claims**



1. An electrical connector member comprising

plastic insert means for carrying at least one contact member and including an end portion with an outer weakened portion,

one-piece insert housing means including an axially extending inner cavity housing a section of said insert means,

insert retaining means in said housing means snugly retaining said insert from axial movement in said cavity in a mounted position,

insert entry means in said housing axially leading to said cavity,

insert compression means in said housing means in axial juxtaposition to said cavity for radially compressing and deforming said weakened portion, and

said weakened portion including a portion permanently deformed beyond its elastic limit by and at least partially disposed in said insert compression means.

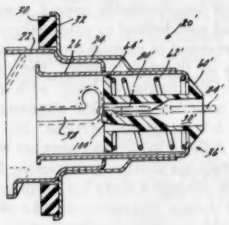
4,072,384

LAMP SOCKET

Marvin W. Moore, Rochester, Mich., assignor to Microdot Inc., Greenwich, Conn.

Continuation of Ser. No. 599,064, July 25, 1975, abandoned. This application Dec. 1, 1976, Ser. No. 746,215
Int. Cl.[2] H01R *13/40*
U.S. Cl. 339—59 L **4 Claims**

1. A lamp socket comprising a socket housing, a core member made of two like sections insertable into sai' housing in one direction and having at least one passageway in each section, said housing being adapted to accept a light bulb in said one direction, said bulb having two contacts, a pair of relatively thin flat rectangular terminals, each having a laterally extending end face and an aperture therethrough spaced from said end face, said terminals being directly attached to electrical conductors, respectively, said terminals adapted to be inserted in the passageway of each section of said core member in a direction opposite to said one direction with the end faces thereof extending beyond said core member in lamp contact engaging position, and a locking tab within each said core



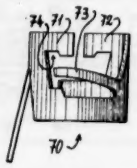
member section extending into the aperture of the terminal therein for securing said terminals within said passageways.

4,072,385

BAYONET CONNECTION BETWEEN TWO ELECTRICALLY CONDUCTIVE COMPONENTS

Peter Wallner, Kriens, Switzerland, assignor to Schurter AG, Luzern, Switzerland

Filed Oct. 12, 1976, Ser. No. 731,559
Claims priority, application Switzerland, Oct. 21, 1975, 13594/75
Int. Cl.[2] H01H *85/16*; H01R *13/54*
U.S. Cl. 339—88 R **15 Claims**



1. A bayonet connection between two electrically conductive components, especially for a fuse holder, comprising a pair of connection components, one of the connection components possessing an electrically conductive spring, said spring being electrically conductively connected with said one connection component, said one connection component has at least one hook-like part provided with a mouth, and said spring comprises an elongate component primarily extending in the peripheral direction and protruding into said mouth of said hook-like part, said spring, when the two connection components are operatively interconnected, electrically conductively contacting the other connection component and uring said other connection component towards said hook-like part.

4,072,386

SOLID SHELL PHONOCONNECTORS

William H. Wallo, Clearwater, Fla., assignor to Perfection Enterprises, Inc., Chicago, Ill.

Filed Feb. 6, 1975, Ser. No. 547,544
Int. Cl.[2] H01R *13/54*
U.S. Cl. 339—91 R **14 Claims**

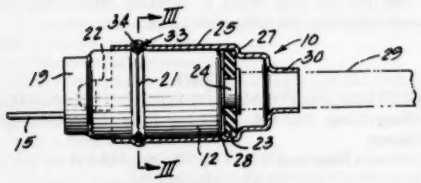
1. A phonoconnector pin plug assembly for coupling with a phonoreceptacle and having an electrically conductive pin plug and an electrically conductive socket shell in electrically insulated concentric relation about the pin plug and with a phonoreceptacle receiving open mouth end directed in the same direction as said plug thereby to facilitate receiving the phonoreceptacle, comprising:

the socket shell being drawn from one piece of thin electrically conductive sheet metal and having a solid tubular wall with an inner substantially uniformly cylindrical

diameter throughout a substantial length portion of the wall extending inwardly from said open mouth end to engage about a complementary cylindrical outside diameter of an electrically conductive phonoreceptacle shell received therein in free sliding fit throughout said length;

said socket shell wall being formed with a radially outwardly projecting annular bulge defining an annular inwardly opening groove in said inner diameter, and spaced a limited distance from said open mouth end so that there is a solid annular leadin length of said wall between said open mouth end and said groove and a substantial length of said wall extends from said groove inwardly for receiving the receptacle shell in said free sliding fit; and

an electrically conductive spring wire resilient split out-of-round clutch ring firmly engaged within said groove and having clutching area of limited circumferential extent projecting generally radially inwardly from the groove and from said inner diameter of the socket shell wall for releasably retainingly engaging the receptacle shell;



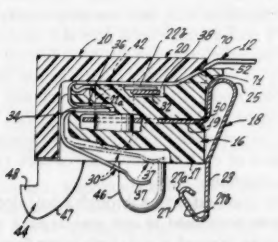
said groove being at least as deep as the cross-sectional diameter of the wire of the clutch ring so that the clutch ring except for said clutching area is received in the groove free from interference with sliding reception of the receptacle shell into mated relation within the socket shell, and the clutching area is located on the ring to protrude from the groove sufficiently for, and in a manner to effect, transverse eccentric thrusting clutching engagement with the receptacle shell to force a large circumferential surface area of the receptacle shell, opposite from where thrust is imposed by said clutching area, into firm electrical as well as retaining contact with the engaged surface of the wall of the socket shell, the spring bias generated in the clutch spring by the thrusting engagement of said clutching area with the receptacle shell also assuring firm electrical engagement of the clutch ring with both of the shells.

4,072,387

MULTIPLE CONDUCTOR CONNECTOR UNIT AND CABLE ASSEMBLY

Jerzy R. Sochor, Hermosa Beach, Calif., assignor to Spectra-Strip Corporation, Garden Grove, Calif.

Filed Feb. 20, 1976, Ser. No. 659,892
Int. Cl.[2] H05K *1/07*; H01R *13/54*
U.S. Cl. 339—91 R **24 Claims**



1. A multiple contact connector unit for electrically connecting a printed circuit board, having multiple electrical contact pad areas, to a flexible normally flat, multi-conductor cable which comprises:

an insulator base having multiple, insulated, laterally aligned, socket means therein extending along substantially the entire length of said insulated base for biasing multiple spring contact members within said insulator base;

pivotal alignment means, affixed to said insulator base, for pivotally mounting said connector unit to said printed circuit board and accurately aligning said connector unit, in a predetermined manner, with said printed circuit board;

an insulator cover;

means to affix said insulator cover to said insulator base, said cover together with said insulator base defining a laterally extending entrance slot therebetween through which said multi-conductor cable may pass and be fixed in place relative to said socket means of said insulator base; and

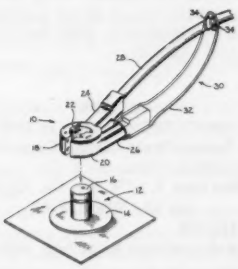
an elongated retention spring, a first end of which extends along substantially the entire length of said insulator base and is affixed thereto, and the other end of which has an elongated gripping portion extending below the lowermost surface of said insulator base, said elongated gripping portion having a length which extends substantially the entire length of said insulator base and which also extends across the entire length of said laterally aligned multiple socket means biasing said multiple spring contact members, said elongated gripping portion being displaced from said insulation base as said connector unit is pivotally mounted onto said printed circuit board but clamping said printed circuit board to said insulator base under a predetermined and substantially uniform contact pressure to thereby urge spring contact members to be contained in said socket members into substantially uniform pressurized electrical contact with said contact pad areas of said printed circuit board after said connector unit and printed circuit board are in full abutment with each other.

4,072,388

ANTI-SNAG DEVICE FOR ELECTRODE LEAD CLIPS

David M. Dunn, Menomonee Falls, Wis., assignor to Marquette Electronics, Inc., Milwaukee, Wis.

Filed Apr. 6, 1977, Ser. No. 785,074
Int. Cl.[2] H01R *13/58*
U.S. Cl. 339—103 R **8 Claims**



1. An anti-snag device for use with a lead clip having an electrical contact portion for engaging an electrocardiographic electrode, said electrical contact portion having first and second generally adjacent arms, each of said arms having one end fixed to said electrical contact portion and a free end, said arms being moveable toward and away from each other for opening and closing the clip, said first arm having a lead wire extending from the free end thereof, said anti-snag device comprising:

elongated means extending from the free end of said second

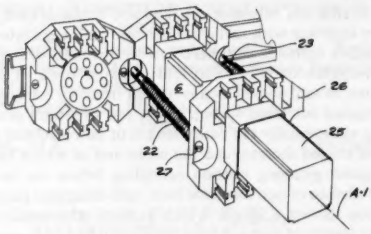
arm and engaging said lead wire at a point removed from the free end of said first arm, said elongated means having sufficient length to permit said toward and away movement of said arms.

4,072,389

STACKED, PLUG-IN RELAYS

George S. Hudimac, Allentown, Pa., assignor to Mechanical Service Company, Inc., Allentown, Pa.

Filed May 16, 1977, Ser. No. 797,438
Int. Cl.[2] H01R *13/62*
U.S. Cl. 339—119 R **5 Claims**



1. An adaptor for use in supporting first and second electricals units, each unit having a mounting base and a housing adapted to be removeably plugged into the base and when the units are supported the top of the housing of the first unit being closely adjacent the bottom of the base of the second unit, the adaptor comprising:

an elongated member including a pair of shanks;

means on one end of one shank for connecting the member to the top of the base of the first unit;

means on one end of the other shank for connecting the member to the bottom of the base of the second unit;

means on the shanks to be engaged whereby to form a substantially rigid part to support the second unit with respect to the first unit and to be disengaged to permit the second unit to be moved with respect to the first unit;

a spring surrounding the shanks, the opposite ends of which are respectively connected to the shanks and the spring urging the shanks into said engagement; and

said spring and said means on the shanks providing for the second unit to first be moved in a direction along the axis of the member to separate the shanks and effect said disengagement and secondly be moved laterally with respect to the axis without the member being disconnected from either base and the second lateral movement placing the second unit in a position to allow the first unit to be removed and/or replaced.

4,072,390

ELECTRICAL CONNECTOR

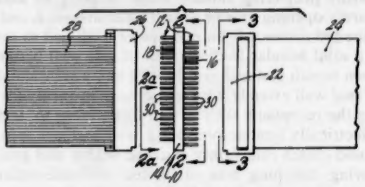
Roy W. Fox, 4 Juniper Circle, Canton, Conn. 06019, assignor to Roy W. Fox, Canton, Conn.

Filed Sept. 9, 1976, Ser. No. 721,768
Int. Cl.[2] H01R *23/02*
U.S. Cl. 339—176 MF **3 Claims**

1. An electrical connector for ribbon cable terminals comprising:

a block of insulating material having a longitudinal axis;

a plurality of substantially identical conductor pins, each having a first end portion projecting from a side of the block and a second end portion projecting from an opposite side of the block, the first end portion and second end portion of each pin being joined by a bent intermediate portion embedded in the block, each pin being shaped such that the respective axes of the first and second end portions thereof are in spaced parallel relationship and are disposed in a common plane with the axis of the intermediate portion therebetween, the pins being arranged in first and second longitudinally extending sets such that on each of the said sides of the block two parallel, laterally adjacent rows of first end portions and second end portions, respectively, are defined with each of the first end portions laterally adjacent a second end portion so as to form



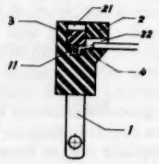
longitudinally spaced pairs of laterally adjacent pins and such that the respective planes defined by the pins in a set are parallel and form acute angles with the longitudinal axis of the block, the respective intermediate portions of a said pair or pins being in crossing relationship when viewed along the axis of the block.

4,072,391

ELECTRIC PLUG FORMED BY SQUEEZING ASSEMBLY

Jui Jung Hung, No. 584, Jui Lung Road, Kaohsiung, China /Taiwan

Filed Aug. 13, 1976, Ser. No. 714,234
Int. Cl.[2] H01R *11/02*
U.S. Cl. 339—196 R **1 Claim**



1. An electric plug comprising

at least one pole plate, each pole plate having a longitudinal axis, a transverse axis, two flat faces, edges and ends;

a squeezing arm on each pole plate at one end thereof, said squeezing arms being integral with said pole piate extending perpendicularly from one of said faces;

a connecting wire electrically associated with each pole plate;

a plug base, said base having an assembly cavity, a pole slot for each pole plate, a wire hole for each wire, at least one latch tunnel, a longitudinal axis, upper and lower ends, front and back faces, and a transverse axis perpendicular to the plane of said front and back faces, each pole slot extending through said lower end of said base terminating in said cavity and being aligned along said longitudinal axis of said base with the major axis of said slot parallel to said transverse axis, said assembly cavity being provided with a recess where each pole slot terminates, each wire hole extending through the back face of said base terminating in said assembly cavity at the recess where the associated pole slot terminates, each said wire hole being aligned parallel with said transverse axis, said at least one latch tunnel extending through said assembly cavity near the level of each wire hole above each recess; and

at least one fixing latch;

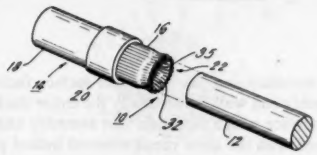
each pole plate extending through a pole slot with its squeezing arm positioned in one recess; each connecting wire extending through a wire hole being fixed into the associated recess by the squeezing arm of the associated pole

plate thereby making an electrical contact between each wire and the
associated pole plate; at least one fixing latch extending through a latch tunnel pressing and fixing each squeeze arm against each connecting wire.

4,072,392
SPRING WIRE FORMED TULIP CONTACT

Lorne D. McConnell, Chalfont, and Leonard J. Kucharski, Harleysville, both of Pa., assignors to Gould Inc., Rolling Meadows, Ill.

Filed Sept. 22, 1976, Ser. No. 725,378
Int. Cl.[2] H01R *13/12*
U.S. Cl. 339—258 R **9 Claims**

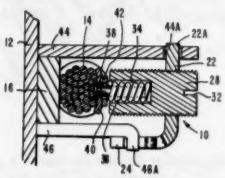


1. A female contact member adapted to engage a male contact member, comprising:
a conductive stud member;
a plurality of spring wire fingers having a circular cross-section, said fingers located adjacent the periphery of said stud member and extending from said stud member to form a female contact sleeve;
means for retaining said fingers in said position adjacent the periphery of and extending from said stud member and for retaining said fingers in good electric contact with said stud member, the periphery of said stud member having a plurality of parallel, longitudinally extending grooves therein, each of said wire fingers being seated in respective ones of said longitudinally extending grooves in the periphery of said stud member.

4,072,393
ELECTRICAL CONNECTORS

Robert E. McDermott, 16 Munro Court, Troy, N.Y. 12180, and William Golden, 1203 Fourth Ave., Watervliet, N.Y. 12189

Filed June 7, 1976, Ser. No. 693,439
Int. Cl.[2] H01R *11/10*
U.S. Cl. 339—272 UC **7 Claims**

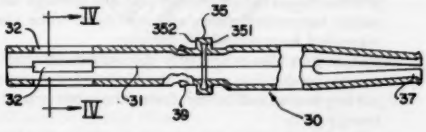


1. An electrical connector of the resilient spring type for clamping a first conductor against a second conductor and for resiliently expanding so as to maintain a clamping force on said first conductor in the event of the deformation of one or both of said conductors, said connector being of the type comprising a frame including means defining a threaded opening therethrough and a connector screw threadedly received in said opening, said screw being turnable relative to said frame to advance a first end thereof in a direction to force said first conductor against said second conductor, said connector being characterized by
A. means defining a cylindrical cavity extending axially to a certain depth into the first end of said screw;
B. a helically coiled spring having lateral dimensions that enable it to be received in said cavity, said spring defining an interior hollow space and including a first end contacting the end of said cavity within said screw and a second, opposite end that normally protrudes from said cavity away from the first end of said screw, said spring having an uncompressed length between about 1.5 to 2.0 times the depth of said cavity; and
C. conductor contacting means including
i. a conductor contacting pad having lateral dimensions greater than those of said cavity, means defining a central aperture therethrough, a first side for contacting said first conductor and a second, opposite side for contacting the second, protruding end of said spring and,
ii. a rivet having a shaft received in said aperture of said pad and protruding from the second side of said pad, said shaft having lateral dimensions that enable it to be received within the interior hollow space defined by said spring, said pad being pivotal about said shaft and resiliently expandable away from the first end of said screw under the action of said spring through a range determined essentially by the difference between the depth of said cavity and the uncompressed length of said spring.

4,072,394
ELECTRICAL CONTACT ASSEMBLY

Clifford R. Waldron; Karl W. Yonkers; Robert Goebeler, all of Unadilla; David L. Frear, Binghamton, and Edward J. Bright, Bainbridge, all of N.Y., assignors to The Bendix Corporation, Southfield, Mich.

Filed Mar. 1, 1976, Ser. No. 662,678
Int. Cl.[2] H01R *11/08*
U.S. Cl. 339—276 T **3 Claims**

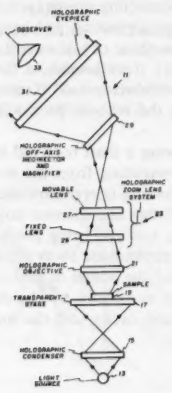


1. An electrical connector assembly comprising:
a housing;
a dielectric insert mounted within said housing, said insert having a plurality of axial bores therein;
means for mounting an electrical contact in each of said axial bore; and
a plurality of electrical contact assemblies each mounted in a respective bore by said contact mounting means, said electrical contact assemblies comprising:
a sleeve stamped and formed from a sheet of metal, said sleeve having:
a front pin portion for mating with a socket contact; and
a rear wire receiving portion having an unwelded seam, and a plurality of axially extending slots in the wall of said sleeve equally spaced from each other with the longitudinal axis of each of said slots parallel to the longitudinal axis of said sleeve;
an enlarged portion located between said front portion and said rear portion, said enlarged portion including a forwardly facing shoulder and a rearwardly facing shoulder; and
an outer sleeve located over the rear wire receiving portion of said sleeve.

4,072,395
MICROSCOPE

Windell N. Mohon, Winter Park, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 24, 1976, Ser. No. 689,015
Int. Cl.[2] G02B *21/00*
U.S. Cl. 350—33 **26 Claims**



1. In a microscope having a predetermined radiant energy path therethrough:

means for generating and broadcasting a predetermined radiant energy;

transparent means spatially disposed from said predetermined radiant energy generating and broadcasting means for supporting an object to be viewed in magnified form on the aforesaid predetermined radiant energy path;

means spatially disposed between said transparent supporting means and the aforesaid radiant energy generating and broadcasting means for condensing a portion of the radiant energy generated thereby and for passing it along said predetermined radiant energy path and through said transparent supporting means and the object to be viewed in magnified form supported thereby;

objective lens means spatially disposed from said radiant energy condensing means, the aforesaid transparent supporting means, and on the aforesaid predetermined radiant energy path;

an off-axis, redirector, and magnifier holographic lens means spatially disposed from said objective lens means and on the path of the radiant energy that has been passed through the object to be viewed in magnified form for effectively and simultaneously redirecting and magnifying the radiant energy passed therethrough as a magnified image thereof; and

biocular eyepiece lens means spatially disposed from said off-axis, redirector, and magnifier holographic lens means for receiving and collimating the aforesaid redirected and magnified object image in such manner that it may be viewed simultaneously by a plurality of sensors responsive to the aforesaid predetermined radiant energy.

4,072,396
FOCUSSING OBJECTIVE MECHANISM FOR TELESCOPIC RIFLE SIGHTS

Cecil Jack Ross, El Paso, Tex., assignor to W. R. Weaver, El Paso, Tex.

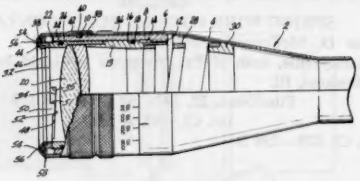
Filed July 10, 1975, Ser. No. 594,904
Int. Cl.[2] G02B *7/04*
U.S. Cl. 350—46 **5 Claims**

1. A focussing objective mechanism for a telescopic gun sight comprising in combination:

a. a sight barrel;

b. an objective lens assembly mounted in said barrel for axial reciprocal movement therein, said lens assembly having one end wall thereof formed with a predetermined helical pitch extending for substantially the entire duration of said one end wall;

c. a ring rotatably mounted on said barrel but fixed against axial movement thereon, said ring being adjacent to said



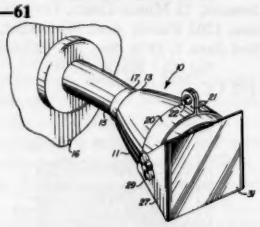
lens assembly and having an end surface facing said lens assembly end wall, substantially the entire duration of said end surface which faces said lens assembly end wall being formed with the same predetermined helical pitch as said lens assembly end wall; and

d. spring means engaging said lens assembly to bias said end wall into engagement with said ring end surface.

4,072,397
MIRROR ATTACHMENT FOR SHOWER HEAD

Thomas H. Ross, 201 E. Monterey Way, Phoenix, Ariz. 85012

Continuation-in-part of Ser. No. 610,653, Sept. 5, 1975, abandoned. This application Aug. 4, 1976, Ser. No. 711,487
Int. Cl.[2] G02B *5/08*
U.S. Cl. 350—61 **15 Claims**



1. A bathroom mirror device for use in a shower, said device comprising:

a. a shower head including,

i. a barrel member having a forward end and a rearward end,

ii. a conduit communicating with said rearward end for delivering water to said barrel portion;

iii. a spray member carried proximate said forward end for emitting water from said barrel member;

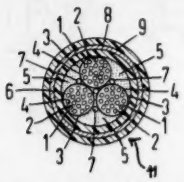
b. a relatively thin panel having a back surface and a front reflective surface; and

c. support means engageable with said shower head for holding said panel in a position in which water from said shower head is received against the back surface of said panel, said panel being thermally responsive to the temperature of said water to prevent condensation of moisture upon said reflective surface.

4,072,398
COMMUNICATION CABLE

Herbert Larsen, Munich; Guenter Zeidler, Unterpfaffenhofen, and Dieter Schicketanz, Munich, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation of Ser. No. 433,310, Jan. 14, 1974, abandoned. This application June 21, 1976, Ser. No. 698,153
Claims priority, application Germany, Jan. 19, 1973, 2302662
Int. Cl.[2] G02B 5/16
U.S. Cl. 350—96.23 2 Claims

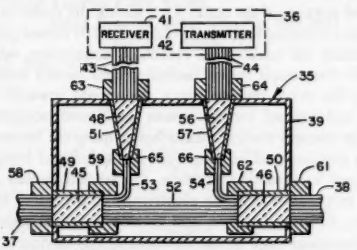


1. A communication cable with a high transmission capacity comprising:
- a plurality of optical fibers, each of said fibers having a protective coating, said plurality of optical fibers being loosely twisted together to define a basic group of optical fibers,
- a sheath surrounding each basic group of optical fibers,
- a first protective sheath surrounding a plurality of said basic groups with clearance between said basic groups and said first protective sheath,
- a metal foil encasing said first sheath,
- a second sheath surrounding said metal foil,
- separate tension-relieving wires lying outside of and adjacent to said basic groups within said first protective sheath, and
- a lubricant filling interspaces between said plurality of optical fibers and said sheath as well as between said basic groups and said first protective sheath so that the optical fibers in each basic group may move relative to each other and each of the basic groups may move relative to each other with an avoidance of mechanical damage.

4,072,399
PASSIVE OPTICAL COUPLER

Roy E. Love, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed July 5, 1973, Ser. No. 376,573
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.16 7 Claims

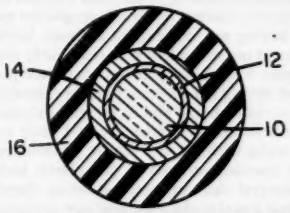


1. A passive optical coupler for use in an optical communication system including first and second optical signal transmission lines, said coupler comprising,
- first and second light mixers, each having an input portion for receiving light and an output portion across which light received by the input portion is relatively evenly distributed, the input portion of said first mixer being adapted to be connected to an end of said first transmission line, and the output portion of said second mixer being adapted to be connected to an end of said second transmission line,
- first coupling means for coupling most of the light at the output portion of said first mixer to the input portion of said second mixer, the remaining light available at the output portion of said first mixer constituting an output optical signal,
- output means for receiving said output optical signal,
- second coupling means disposed adjacent to the output portion of said first mixer for coupling said output optical signal to said output means,
- input means for providing an input optical signal, and
- third coupling means for coupling said input optical signal from said input means to the input portion of said second mixer.

4,072,400
BUFFERED OPTICAL WAVEGUIDE FIBER

Stewart A. Claypoole, Painted Post, and Daniel C. Wilhelm, Campbell, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Continuation-in-part of Ser. No. 593,286, July 7, 1975, abandoned. This application June 4, 1976, Ser. No. 692,895
Int. Cl.[2] G02B 5/14
U.S. Cl. 350—96.30 13 Claims

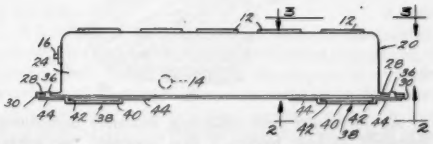


1. A buffered optical waveguide fiber comprising
an optical waveguide fiber,
- a resinous protective coating applied to the external longitudinal surface of said fiber,
- a coating of a release agent applied over said protective coating, and
- a protective layer of a thermoplastic synthetic resinous material surrounding said fiber disposed over said coating of release agent.

4,072,401
MOUNTING ARRANGEMENT FOR CASED ELECTRICAL COMPONENTS

John C. Instone, Cherry Hill, N.J., assignor to SGL Industries, Inc., Haddonfield, N.J.

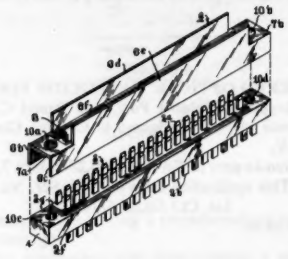
Filed Dec. 21, 1976, Ser. No. 753,354
Int. Cl.[2] H02G 3/10
U.S. Cl. 339—125 R 9 Claims



1. A cased electrical component wherein the case comprises a base having a generally planar exterior face and a cover which cooperates with the base to define an internal space in

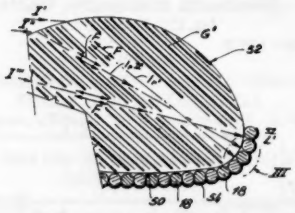
which the electrical component is located, said case having at least two integral ears lying generally in the plane of the exterior surface, each of said ears having an aperture therethrough, means adjacent each ear and fixed to said case in a position such that the respective aperture is obstructed; and a mounting bracket of the temporary mounting type attached to said exterior surface adjacent each ear and projecting from said exterior surface in a direction at a right angle thereto.

4,072,402
ELECTRICAL CONNECTOR
Robert J. Butler, 101 Bowdoin St., Malden, Mass. 02148
Filed Jan. 19, 1976, Ser. No. 650,434
Int. Cl.[2] H01R *13/46*
U.S. Cl. 339—136 M **4 Claims**



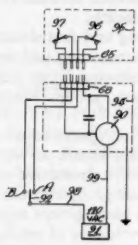
1. An electrical connector of the type adapted to mate with a female connector having a pair of receptacles each adapted to receive a keying pin, comprising a plastic body having an opening adjacent one end adapted to removably receive one of said keying pins, a plurality of metal connector pins each embedded in and having a projecting portion extending from one surface of said plastic body, and an integral extruded sheath of H-shaped cross section positioned on said body and having a pair of side walls with parallel planar portions positioned in contact with opposed surfaces of said plastic body and each having an integral skirt portion extending therefrom for a distance at least equal to the length of said projecting portions of said pins, and a bridge formed integrally with said side walls and maintaining said side walls in fixed space relationship, said bridge having a transverse opening positioned in alignment with said opening in said plastic body, thereby to reinforce said plastic adjacent said opening.

4,072,403
RETRO-REFLECTING ASSEMBLY
Ludwig Eigenmann, Vacallo, Switzerland
Filed July 15, 1976, Ser. No. 705,596
Claims priority, application Italy, July 16, 1975, 25456/75; June 6, 1976, 24096/76; July 6, 1976, 25067/76
Int. Cl.[2] G02B *5/128*
U.S. Cl. 350—105 **6 Claims**



1. An improved retro-reflecting assembly comprising a transparent globule having a first uncoated part-spherical surface portion positioned to be impinged by light rays, a second substantially flat surface portion opposite said first surface portion and a toroidal surface portion intermediate said first and said second surface portions and having a generatrix of radii of curvatures considerably smaller than that of said first part spherical surface portion; and a monolayer of externally reflecting transparent microspheres for focussing and retro-reflecting light beams which impinge on said first surface portion and which have passed through and being reflected by said globule, said monolayer being applied to said second substantially flat surface portion and to at least part of said toroidal surface portion.

4,072,404
CONTROL MECHANISM FOR POSITIONING PROJECTION SCREEN IN CLOSED POSITION
Donald J. Brown, Naperville, Ill., assignor to Knox Manufacturing Co., Wood Dale, Ill.
Filed Jan. 9, 1976, Ser. No. 647,870
Int. Cl.[2] G03B *21/56*; A47G *5/02*; A47H *1/00*
U.S. Cl. 350—117 **6 Claims**



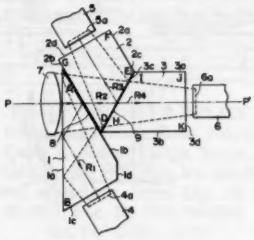
1. A motor driven wall-type projection screen apparatus, comprising an elongated casing adapted to be mounted on a supporting surface, the casing having flange portions to afford a longitudinally extending slot; an elongated roller rotatably journalled in the casing; a flexible projection screen having a transverse marginal edge portion secured to said roller and a free marginal edge portion suspended from the roller, said screen being wound upon said roller when in closed position and being unwound from said roller when in exposed viewing position; a reversible electric drive unit operatively connected to one end portion of the roller for rotating the roller to move said screen to exposed viewing position and to closed position; circuit means for making an electrical connection with the drive unit, the circuit means including first switch means for actuating the drive unit to move the screen toward closed position and second switch means positioned adjacent the roller, said second switch means being movable between an actuating position and an inoperative position and being normally urged to actuating position, the second switch means when in inoperative position electrically interrupting the circuit means to the drive unit; and an elongated slat secured to the free marginal edge of the screen, the slat having a length and shape to nest within and substantially close the slot in the casing when the screen is in closed position, a portion of said slat when so nested being positioned to engage the second switch means to move said second switch means from actuating position to inoperative position to open the circuit means and arrest movement of the drive unit and of the roller.

4,072,405

PRISM SYSTEM FOR USE IN TRICOLOR SEPARATION

Banri Ozeki, Tokyo, Japan, assignor to Tokina Optical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 586,703, June 13, 1975, abandoned. This application Feb. 7, 1977, Ser. No. 766,005
Claims priority, application Japan, June 13, 1974, 49-66590
Int. Cl.[2] G02B *27/14;* H04N *9/04*
U.S. Cl. 350—173 4 Claims



1. A prism system for use in tricolor separation, the system comprising:

a first prism of a right-angled triangular shape, said first prism having an oblique surface end and a first base surface forming an angle of 30° with its oblique surface;

second and third prisms of a trapezoidal shape, each having parallel top and bottom surfaces, and an oblique surface forming an angle of 120° with its top surface, said oblique surfaces of said second and third prisms being adjacent;

a first interference filter interposed and bonded between said first base surface of said first prism and said bottom surface of said second prism whereby when light passes through said oblique surface of said first prism at a right angle thereto and is incident upon said first interference filter, light of one wave length range having one of three primary colors reflected by said first interference filter, while light components of the other wave length ranges are allowed to be transmitted through said first interference filter in the same direction as that of the incident light; and

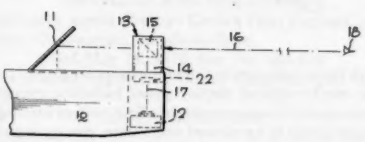
a second interference filter interposed and bonded between said oblique surface of said second prism and said oblique surface of said third prism, whereby a transmitted light component of another light wave length range of the three primary colors is reflected by said second interference filter, while the remaining light component of the remaining light wave range is transmitted through said second interference filter.

4,072,406

CAMERA PERISCOPE WITH LOUVERS FOR CONTROLLING LIGHT SCATTERING

Maurice G. Amesbury, 22552 Lark Spring Terrace Diamond Bar,, Los Angeles, Calif. 91765

Filed June 17, 1976, Ser. No. 697,202
Int. Cl.[2] G02B *27/14*
U.S. Cl. 350—173 7 Claims



1. A periscope for mounting onto a gunsight along the line of sight between a viewer and a target display, the combination comprising:

an elongated housing;

a beam-splitter cube mounted on said housing on said line of sight;

means incorporated into said beam-splitter cube for branching an image simultaneously to the viewer and to the lens of a camera;

front and rear panels carried on said housing of light transparent material so as to avoid obstruction of the viewer's line of sight;

said housing having opposite sides of opaque material;

said front and rear panels are light control films; and

said light control films comprise microlouvers for controlling the scattering of stray light introduced to said housing.

4,072,407

APPARATUS FOR HOLDING, READING AND HANDLING BOOKS

Andre Zeisky, 21 Sturgis Road, Kendall Park, N.J. 08824

Filed June 21, 1976, Ser. No. 697,828
Int. Cl.[2] G02B *27/02;* B42D *17/00, 9/00*
U.S. Cl. 350—241 15 Claims

1. Apparatus for aiding in the handling of books comprising a body having an elongated member adapted to fit along the center line of an open book, said body having means fixed at one end resiliently biased with respect to said body for removably fastening said body to the spine of said book, said body being formed of an elongated continuous wire provided with a reverse bend forming a pair of parallel coplanar elongated slide members between its ends, said slide members being spring loaded with respect to each other, and an auxiliary member slidably secured to one of said parallel members for manual movement along its length in association with the printed matter in said book and held at least in part against movement therealong by the bias of said parallel slide members.

4,072,408

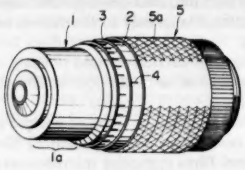
LENS MOUNT FOR A MICROSCOPE OBJECTIVE

Toshifumi Uetake, and Tsutomu Tojyo, both of Hachiouji, Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Mar. 23, 1976, Ser. No. 669,474
Claims priority, application Japan, Mar. 28, 1975, 50-40955
Int. Cl.[2] G02B *7/04*
U.S. Cl. 350—255 2 Claims

1. A lens mount for a microscope objective comprising a correcting thin ring for moving a part of lenses constituting the objective along the optical axis for the purpose of correcting aggravation of aberrations caused by variation in thickness of cover glasses, and a friction band arranged round the outer surface of said correcting ring for finger bulb movement of said ring and made of soft and frictional material such as rubber,

said microscope objective being used by mounting to a revolver closely spaced to other microscope objectives which



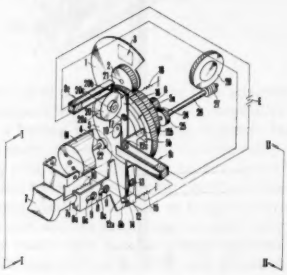
necessitates said ring being thin and being arranged to correct aggravation of aberrations by moving said part of lenses by rotating said friction band.

4,072,409

RELEASE DEVICE OF MOTION PICTURE CAMERA

Noritsugu Hirata, Yokohama; Tomoshi Takigawa, Machida, and Kazuo Ishikawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 11, 1976, Ser. No. 685,190
Claims priority, application Japan, May 19, 1975, 50-59439
Int. Cl.[2] G03B *1/00*
U.S. Cl. 352—174 **17 Claims**



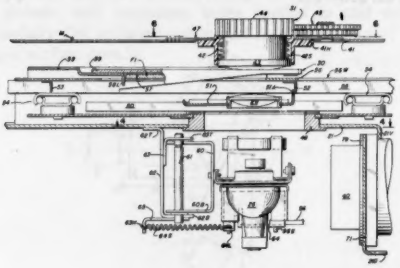
1. A motion picture camera comprising:
(a) an exposure aperture,
(b) rotatable shutter means arranged for selectively uncovering and covering said exposure aperture by the rotational movement,
(c) stop means arranged normally for latching said shutter means at a position in which the shutter means fully covers the exposure aperture, said stop means being movable in either of at least a first and a second predetermined plane of substantially different orientation and releasing the latching of the shutter means of the movement in said first plane,
(d) release means manually operable from the outside of said camera and arranged upon acutation for displacing said stop means in said first plane from its latching position to its unlatching position against said shutter means, said release means being operatively engageable with the stop means, so long as the stop means is retained in said first plane, and
(e) disengaging means responsive to the rotational operation of said shutter means for displacing said stop means in at least said second plane to break off the operative engagement with said release means and thereafter for causing said stop means to return to its latching position against said shutter means once during each revolution of the shutter means,
thereby only one single frame shot being made possible despite the fact that said release means remains held in the actuated position.

4,072,410

CONVERTIBLE INPUT READER-PRINTER

Frank L. Kratcoski, Trapon Springs, Fla., and Herbert H. Hausmann, Prairie View, Ill., assignors to Oce'-Industries, Inc., Chicago, Ill.

Filed Apr. 22, 1976, Ser. No. 679,246
Int. Cl.[2] G03B *21/11*
U.S. Cl. 353—68 **13 Claims**



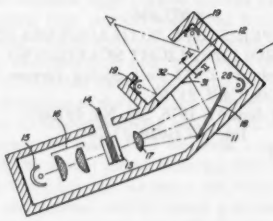
1. A convertible arrangement for selectively shifting fiche film projecting means and roll film projecting means into operative alignment with a common optical axis that intersects a fiche image plane and extends to a projection plane, the arrangement being characterized in that the fiche film projecting means includes beam projecting structure mounted for controlled shifting movement between an operative position of alignment with the optical axis and an out-of-the-way position spaced from the optical axis, the roll film projecting means includes beam projecting structure mounted for controlled shifting movement between an out-of-the-way position spaced from the optical axis and said operative position of alignment, and selectively operable control means interconnecting the fiche beam projecting structure and the roll beam projecting structure in ganged relationship to effect controlled shifting movement thereof for converting between a fiche film imput mode and a roll film input mode.

4,072,411

DISPLAY DEVICE HAVING IMAGE SENSE REVERSAL CAPABILITY

Lee Fitzpatrick Frank, and Joseph Yorks Kaukeinen, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 3, 1976, Ser. No. 682,304
Int. Cl.[2] G03B *21/00*
U.S. Cl. 353—121 **21 Claims**



1. An improved viewing device comprising:
a. an electro-optical display panel including means for receiving and storing an electric field pattern corresponding to an image to be viewed and means, responsive to such a received pattern, for modulating incident light in accordance with such pattern;
b. imaging means for applying an imagewise electric field pattern across said display panel thereby establishing in

said panel a light modulating pattern corresponding to said field pattern in a first image sense; and

c. reversing means for selectively impressing a uniform electric field across said panel with the imagewise field pattern stored therein, said uniform field being of the same polarity as said field pattern and of magnitude sufficient to reverse said first modulating pattern to a second light modulating pattern corresponding to said field pattern in an image sense opposite to said first modulating pattern.

4,072,412

IMAGE TRANSFER DEVICE

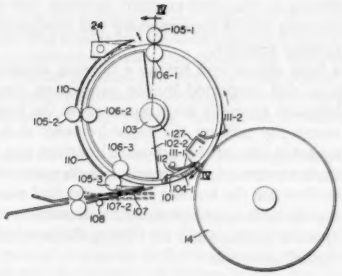
Masashi Suda, Iruma, and Shunichi Kubo, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1975, Ser. No. 643,804

Claims priority, application Japan, Dec. 28, 1974, 50-2500; Dec. 28, 1974, 50-2501; Dec. 28, 1974, 50-2502

Int. Cl.[2] G03G *15/16*

U.S. Cl. 355—3 TR **16 Claims**



1. An image transfer device for causing developed images formed on an image-bearing member to be transferred therefrom to a transfer medium, said device comprising:

corona discharge means opposed to said image-bearing member for imparting corona discharge;

gripper means for gripping the leading end edge of said transfer medium;

support means extending between said corona discharge means and said image-bearing member and supporting said gripper means for circulatory movement; and

transfer medium confining means for confining the path of the transfer medium gripped and guided by said gripper means substantially within the path of said gripper means, said transfer medium confining means including at least one set of confining roller pairs disposed with the path of said gripper means intervening therebetween.

4,072,413

ELECTROSTATOGRAPHIC REPRODUCTION METHODS AND MACHINES

Colin Lawrence Amess, Welwyn Garden City, England, assignor to Xerox Corporation, Stamford, Conn.

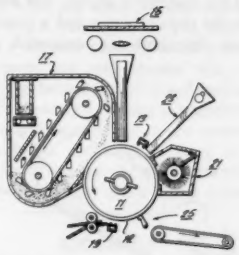
Filed May 11, 1976, Ser. No. 685,478

Claims priority, application United Kingdom, Oct. 31, 1975, 45375/75

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—3 CH **3 Claims**

1. An electrostatographic reproduction machine in which imaging radiation is transmitted from a insulation layer to form a latent image of a document or other information, including a charging corotron arranged to differentially charge said layer such that said layer is relatively more highly charged centrally to compensate in the formation of said latent image for differential reductions of the imaging radiation, said layer being arranged to be moved relative to and in an arcuate path adjacent said corotron which is misaligned with respect to a line parallel to the axis of said arcuate path.



4,072,414

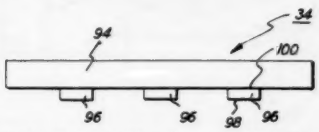
SCREEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE

William J. Hanson, Macedon, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 29, 1976, Ser. No. 736,989

Int. Cl.[2] G03G *15/01*

U.S. Cl. 355—4 **15 Claims**



1. An electrophotographic printing machine for reproducing a transparency, including:

a photoconductive member;

means for charging at least a portion of said photoconductive member to a substantially uniform level;

a screen member comprising a plurality of opaque regions with at least a portion thereof having a light reflecting surface on one side thereof and a light absorbing surface on the other side thereof; and

means for projecting a light image of the transparency through said screen member onto the charged portion of said photoconductive member to record thereon a modulated electrostatic latent image, said screen member being positioned so that the reflecting surfaces of the opaque regions form a visual image of the transparency and the absorbing surfaces of the opaque regions absorb incident light rays.

4,072,415

APPARATUS OF GENERATING CONTROL SIGNALS FOR CONTROLLING AN OPERATION OF AN ELECTROPHOTOGRAPHIC COPYING MACHINE

Kazuya Inoue, Musashino, and Yukio Katano, Kawaguchi, both of Japan, assignors to Kabushiki-Kaisha K I P, Tokyo, Japan

Filed Aug. 26, 1976, Ser. No. 718,208

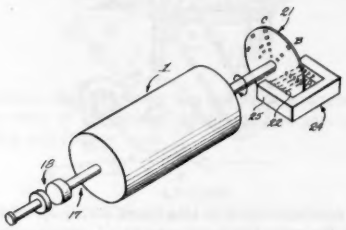
Claims priority, application Japan, Sept. 8, 1975, 50-108098

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—14 **6 Claims**

1. An apparatus of generating control signals for controling an operation of an electrophotographic copying machine of the type wherein said control signals are generated in timed relationship with rotation of a photosensitive drum disposed in said copying machine, the improvement comprising a disk having through-holes therein and driven in association with said photosensitive drum, a light emitting device, a photosensi-

tive device spaced apart from said light emitting device to sense binary coded light signals formed by said light emitting device and said through-holes of said disk and a decoder connected to said photosensitive device, said disk having a strobe section for strobe through-holes and a plurality of code sections for code through-holes associated with said strobe



through-holes, said strobe section and said code sections being formed in outer and inner radial portions, respectively, of said disk, and the arrangement being such that as said disk rotates said strobe and code through-holes are, in operation, brought into registration with the path of light from said light emitting device to said photosensitive device to permit light to pass through said through-holes.

4,072,416

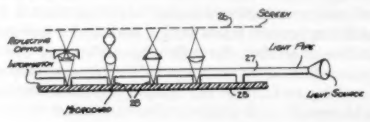
OPTICAL SCANNING SYSTEM FOR READING MICRO-IMAGE RECORDS

Adnan Waly, Stamford, Conn., assignor to Izon Corporation, Stamford, Conn.

Division of Ser. No. 291,589, Sept. 25, 1972, Pat. No. 4,033,686, which is a division of Ser. No. 135,996, April 21, 1971, Pat. No. 3,704,068. This application Apr. 9, 1976, Ser. No. 675,620

Int. Cl.[2] G03B *27/44*

U.S. Cl. 355—46 **5 Claims**



1. An optical system for reading a microrecord wherein a plurality of data sets are formed on the face of a planar record medium, each data set representing a reduced scale image of a distinct page of intelligence and being dissected into a multiplicity of data sub-sets which are dispersed on the medium in accordance with a predetermined pattern, the dispersed sub-sets which constitute the plurality of data sets being interlaced with each other whereby each data set occupies a distinct position on the medium and may optically be extracted therefrom, said optical system comprising an array of lensettes in parallel relation to the record medium, each lensette in the array being optically aligned with a respective correspondingly-positioned sub-set in a selected data set and being constituted by a reflective concave element and a reflective spherical element associated therewith to project an image of the sub-set to recreate the page represented by the selected data set.

4,072,417

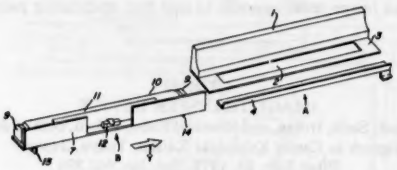
EXPOSURE DEVICE FOR A XEROGRAPHIC COPYING MACHINE

Koichi Motomura, Ebina, Japan, assignor to Rank Xerox Ltd., London, England

Filed Sept. 13, 1976, Ser. No. 722,941

Int. Cl.[2] G03B *27/54*

U.S. Cl. 355—67 **2 Claims**



1. An exposure device for a xerographic copying machine comprising:

(a) a rail unit adapted to be rigidly mounted to the copying machine, the rail unit having supporting means, means defining an elongated exposure aperture, and an elongated reflecting mirror located along one elongated side of the exposure aperture,

(b) a light source unit having a housing adapted to be slid along and supported by the supporting means, and an elongated exposure lamp mounted on the housing, and

(c) means for guiding the exposure lamp along the other elongated side of the exposure aperture and for limiting the movement of the housing in a direction transverse to the direction the housing is to be slid, and means for stopping the housing in a predetermined position alongside the exposure aperture and for biasing the housing against the supporting means.

4,072,418

DEVICE FOR PREVENTING MOVEMENT OF AN ORIGINAL DOCUMENT ON A RECIPROCATING COPIER PLATEN

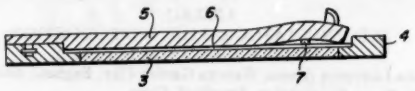
Kaoru Fujizuka, Ebina, Japan, assignor to Rank Xerox Ltd., London, England

Filed Mar. 16, 1976, Ser. No. 667,919

Claims priority, application Japan, May 29, 1975, 50-71345

Int. Cl.[2] G03B *27/62*

U.S. Cl. 355—75 **1 Claim**



1. An electrostatic copying apparatus including a reciprocating platen and a means for facilitating removal of a document from said platen without creating a vacuum hold on said document, said facilitating means comprising:

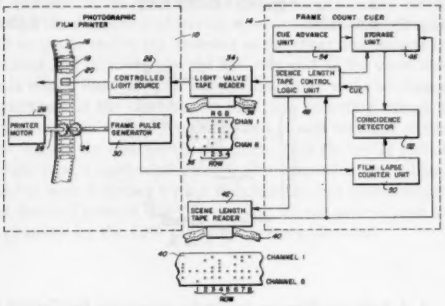
a. a platen cover, and

b. space creating means detachably secured to said cover and adapted when said cover is closed to allow through-flow of air over said document on said platen whereby the vacuum associated with the lifting of the platen cover away from the documents is substantially reduced.

4,072,419
FRAME COUNT CUER FOR PHOTOGRAPHIC FILM PRINTERS

Charles J. Watson, Elgin, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Sept. 26, 1974, Ser. No. 509,590
Int. Cl.[2] G03B 27/78
U.S. Cl. 355—83 **16 Claims**



1. An apparatus for monitoring the passage of film through a photographic film printer and for controlling the operation of the printer in accordance with the monitoring information, wherein the printer includes a selectively controllable light source and a signal generator providing an output signal related to the quantity of film passing through the printer, comprising:

storage means for storing film frame addressing cuing information in integral units of length greater than a frame and in numbers of frames;

a bi-directional counter unit including a direction sensing means for connection with the signal generator providing an incremental or decremental count in said integral units of length and in numbers of frames of the film passing through the printer;

comparator means for comparing the information in said storage means with the count of said counter unit and providing an output cue signal to said printer upon the occurrence of a predetermined relation between the storage means and said counter unit wherein the comparator means includes a programmable means for selectively varying said information stored in said storage means to provide for the occurrence of a predetermined relation between the storage means and the counter unit either in advance of or after the information originally stored in the storage means; and

selectively actuatable reset means connected to said comparator means to reset said bi-directional counter upon the occurrence of said cue signal.

16. A frame count cuer for monitoring the passage of film through a film printer and for controlling the operation of a selectively controllable light source on the printer in accordance with monitoring information, comprising:

a signal generator on the film printer providing an output signal related to the quantity of film passing through the printer;

a control element comprising a punched tape bearing film frame cuing information;

reader means for reading the control element and providing a signal related to said cuing information in integral units of length greater than a frame and in numbers of frames;

storage means connected to the reader means for storing film frame cuing information read by said reader means in said integral units of length and numbers of frames;

direction sensing means connected to the signal generator providing a first signal for film passing through the printer in a first direction and second signal for film passing through the printer in a second direction;

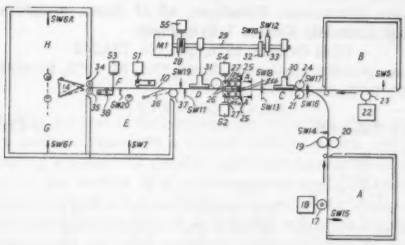
a counter unit connected to the direction sensing means for receiving said first and second signals from the direction sensing means to provide a count in integral units of length and numbers of frames of film passing through the printer; and

comparator means for comparing the information in said storage means with the count of said counter unit and providing an output cue signal to said printer upon the occurrence of a variable predetermined relation between the storage means and said counter unit, wherein the control element is formed in a loop and said cuer includes a discriminator means for sensing a predetermined code upon said tape, and master reset means connected to said discriminator means providing a reset signal to the counter unit upon sensing the predetermined code for continuous, loop operation of the frame count cuer.

4,072,420
MICROFILM CARD DUPLICATION

Anthony John Wicks, London, and Eric Terence Wilson, Medstead, both of England, assignors to Wicks & Wilson Limited, London, England

Filed Jan. 26, 1976, Ser. No. 652,146
Claims priority, application United Kingdom, Apr. 8, 1975, 14404/75
Int. Cl.[2] G03B 27/30
U.S. Cl. 355—100 **18 Claims**



1. A microfilm card duplicating machine comprising means for feeding copy cards sequentially to an image reproducing means for duplicating images carried by master cards fed thereto onto one or more copy cards per master, means for routing copy and master cards to a receiving station after copying and master card delaying means for enabling delivery of a master card to the receiving station only when its duplicate copy card(s) have been delivered thereto to form an interleaved stack of master and copy cards arranged with said one or more copy cards being preceded in each case by the associated master card.

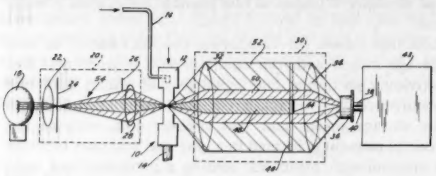
4,072,421
METHOD AND APPARATUS FOR OPTICAL DISCRIMINATION OF PARTICLES

Lawrence J. Coyne, White Plains; Wilberdan V. George, Brooklyn, and Warren Groner, Whitestone, all of N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed Aug. 30, 1976, Ser. No. 718,745
Int. Cl.[2] G01N 33/16, 21/26
U.S. Cl. 356—39 **20 Claims**

1. Apparatus for discriminating particles having particular light absorbing and scattering characteristics when illuminated by a beam of light, comprising: means for passing said particles, in turn, along an optical interaction station, a light source for directing a beam of light transversely through said station along an optical axis, and an optical detection system having an entrance aperture and including a photodetector for receiving light as scattered and absorbed by particles being passed, in turn, through said station, said detection system including means intermediate said station and said photodetector for

partially obstructing an interior portion of said light beam while passing to said photodetector a portion of said scattered



light which is substantially equal to the light which is scattered by said particles, in turn, outside said entrance aperture.

4,072,422

APPARATUS FOR INTERFEROMETRICALLY MEASURING THE PHYSICAL PROPERTIES OF TEST OBJECT

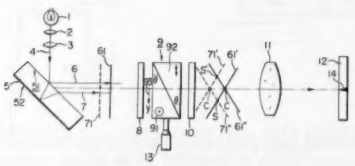
Nobuyoshi Tanaka, Yokohama; Mitsuo Takeda, Kawasaki, and Kazuya Matsumoto, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 20, 1976, Ser. No. 734,245

Claims priority, application Japan, Oct. 27, 1975, 50-129105; Oct. 27, 1975, 50-129106

Int. Cl.² G01B *9/02*

U.S. Cl. 356—108 **9 Claims**



1. An apparatus for interferometrically measuring the physical properties of a test object having at least two surfaces including a first surface making a portion of incident light reflected and another portion of the light transmitted and a second surface making at least a portion of incident light reflected, said test object being to permit the propagation of the light between said first and second surfaces, which comprises:

illumination means for illuminating said test object with broadband light so as to form first and second wave fronts having therebetween an optical path difference corresponding to the optical path length between said first and second surfaces of said test object,

interference fringe forming means for receiving said first and second wave fronts, splitting said first wave front into third and fourth wave fronts tilted to each other and said second wave front into fifth and sixth wave fronts tilted to each other and making said third wave front intersect said fourth and sixth wave fronts and further said fifth wave front intersect said fourth and sixth wave fronts so as to form a broadband light interference fringe,

image forming means for forming an image of said test object in the position where said broadband light interference fringe is formed by said interference fringe forming means, and

viewing means for allowing to view the image of said test object and said broadband light interference fringe simultaneously.

4,072,423

LIGHT INTERFERENCE DEVICE WITH LOW DEGREE OF SPACIAL COHERENCE

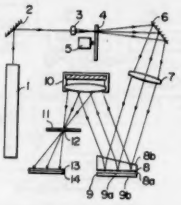
Yoshiaki Kimura, Hachioji, and Hiroshi Ito, Inagi, both of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Jan. 16, 1976, Ser. No. 649,847

Claims priority, application Japan, Jan. 21, 1975, 50-9402

Int. Cl.² G01B *9/02*

U.S. Cl. 356—109 **6 Claims**



1. A light interference device for measuring the flatness of a surface to be measured, said surface to be measured being one side of a plate of transparent material having a back face, said device comprising a light source, an optical element having a reference surface for interference upon which a parallel light bundle from the light source impinges and passes through and from which a parallel light bundle is reflected, said reference surface being locatable adjacent but spaced from said surface to be measured whereby interference fringes are generated as a result of the interaction of light rays reflected from said reference surface and from said surface to be measured, said light source having a low degree of spatial coherence whereby said interference fringes are localized near said interference surface, an optical system between said light source and said reference surface for providing a parallel light bundle coming out from said reference surface toward said surface to be measured at an angle θ within the range of $0° < \theta \leqq 30°$, an observing surface, and an optical projection system for projecting interference fringes localized near said interference surface onto said observing surface.

4,072,424

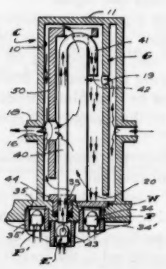
OPTICAL DEVICE FOR MEASURING THE TURBIDITY OF A LIQUID

James P. McMullan, and Albert Stevens, both of 2630 Seaman Ave., El Monte, Calif. 91733

Filed Jan. 30, 1976, Ser. No. 653,739

Int. Cl.² G01N *21/26*

U.S. Cl. 356—208 **10 Claims**



1. A turbidimeter comprising a chest with an elongate fluid conducting chamber having upstream and downstream sides, inlet and outlet ports communicating with the upstream and downstream sides of the chamber between the ends thereof,

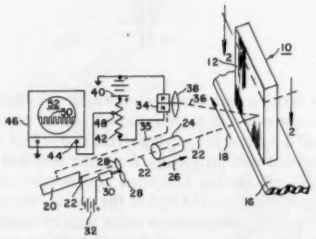
flow directing means in the chamber in the upstream side portion thereof directing fluid flowing into the chamber through the inlet port longitudinally outwardly toward the opposite ends and thence toward the downstream side of the chamber, a light emitter at one end of the chest outside the chamber, an elongate light conducting light pipe with an inlet end exposed to the emitter, extending longitudinally freely through the chamber and having a recurvate free end portion with an outlet end in the chamber at the other end portion of the chest and disposed toward said one end of the chest and across which fluid directed toward said other end and thence downstream in the chamber by said flow directing means is directed, a light responsive photo cell at said one end of the chest outside the chamber in alignment with the outlet end of the light pipe, a light conducting window between the cell and chamber with a surface within the chamber and across which fluid directed toward said one end and thence downstream in the chamber by the flow directing means is directed.

4,072,425

METHOD OF INDICATING THE RELATIVE ROUGHNESS OF A SURFACE

Thomas Guttman, Philadelphia, Pa., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 9, 1976, Ser. No. 713,069
Int. Cl.[2] G01N *21/48*
U.S. Cl. 356—209 **9 Claims**



1. A method of indicating the relative roughness of a surface finished with a plurality of substantially uniform parallel grooves, said method comprising the steps of:

directing an incident beam of light substantially perpendicularly to said surface,

interrupting said incident beam periodically,

focusing said beam so that its width at said surface is substantially that of the narrowest groove that represents the least roughness to be indicated,

providing a light-sensitive device disposed laterally of said beam to received reflected light of said beam from said surface,

providing relative motion between said surface and said beam in a direction substantially perpendicular to the direction of said grooves, and

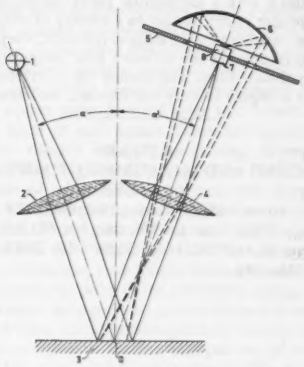
converting the energy of said reflected light received by said device to a visual display, whereby to indicate the relative roughness of said surface.

4,072,426

METHOD AND APPARATUS FOR DETERMINING THE REFLECTIVE PROPERTIES OF SURFACES, ESPECIALLY COATED SURFACES

Herwig Horn, Graz, Austria, assignor to Pluss-Staufer AG, Oftringen, Switzerland and Zentrum fur Elektronemikroskopie, Graz Steyrergasse, Austria

Filed Aug. 8, 1974, Ser. No. 495,576
Claims priority, application Germany, Jan. 17, 1974, 2402127
Int. Cl.[2] G01N *21/48*
U.S. Cl. 356—212 **11 Claims**



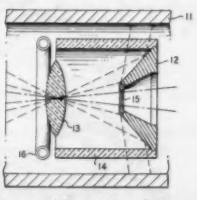
1. The method of determining the reflective characteristics of a surface, especially a coated surface, which comprises; directing a bundle of parallel light rays against a substantial area of the surface at a predetermined angle of incidence, condensing with a first condensing means first light rays which reflect from said surface at an angle of reflection numerically equal to said angle of incidence, simultaneously condensing with a second condensing means second light rays that reflect from said surface at an angle which is numerically different from said angle of incidence and disposed in surrounding relation to the condensed first light rays which have passed through said first condensing means and falling within predetermined inner and outer radial limits, intercepting the condensed first and second light rays by respective light sensitive electrical components, and comparing the changes in value of said components to arrive at a value for the reflective characteristics of said surface.

4,072,427

FAULT INSPECTION SYSTEM

Dietrich Anselm Alsberg, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 28, 1976, Ser. No. 709,308
Int. Cl.[2] G01N *21/32*
U.S. Cl. 356—241 **2 Claims**



1. A visual fault inspection system for waveguide and the like comprising a thin-walled hollow cylinder of optical transparent material, lens means mounted at one end of said cylinder, a conical reflector mounted in-line with said lens means at

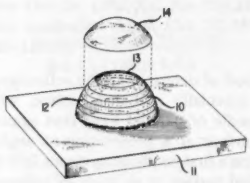
the other end of said cylinder to permit the viewing of objects substantially at right angles to the optical axis of the lens means, said conical reflector having the center portion of the cone eliminated to provide a forward look into the waveguide, a negative lens mounted in the center aperture of the conical reflector to compensate for focusing differentials, light means positioned adjacent the end wall of said cylinder at which said lens means is mounted to provide the requisite illumination of the internal wall of the waveguide and of the forward area, a video transmitter including a camera tube positioned to receive images relayed by said lens means, means for producing a polar scan in the camera tube, a video receiver including means for displaying signals obtained from the polar scanned camera tube in accordance with a rectangular raster, means for restricting the rectangular raster display to a display of only the internal wall image reflected by the conical reflector, a separate display means for displaying the forward look image in the original polar coordinate form, and means for restricting this latter display to a display of only the forward look image.

4,072,428

INSPECTING AND MEASURING OF SOFT CONTACT LENSES

Herbert L. Moss, 845 Field Ave., Plainfield, N.J. 07060

Filed June 1, 1976, Ser. No. 691,349
Int. Cl.[2] G01N *21/16;* G02B *7/02;* G01B *9/00*
U.S. Cl. 356—244 **6 Claims**



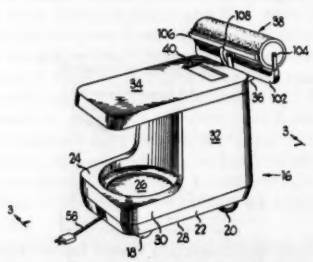
1. A series of tools for inspecting and measuring soft contact lenses, each said tool comprising a substantially flat plate formed integrally with a convex semispheroidal protrusion having a round central opening, the inverse concave interior of each said protrusion being dimensioned to form a snap-on fitting for the stop of a standard measuring instrument, the protrusions of the tools of said series having graduated external radii of curvature.

4,072,429

PAINT ROLLER

Rouben T. Terzian, Chicago, and Derek A. Brand, Naperville, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Sept. 4, 1975, Ser. No. 610,119
Int. Cl.[2] B43K *5/02;* B44D *3/28*
U.S. Cl. 401—146 **13 Claims**



1. Apparatus for applying paint or other fluid material to a surface, which apparatus comprises a wheeled carriage for movement along a floor or other generally flat surface, said carriage including a base element supported by wheels and having a well for receiving a paint pail or the like, peristaltic pump means mounted on said carriagne including a flexible conduit for delivering fluid therethrough from the pail positioned in said well, and applicator means having a paint absorbent surface and manifold means for receiving paint from said conduit and distributing the paint evenly over said absorbent surface,

wherein said applicator means is a paint roller having a bifurcated yoke with a handle secured thereto and said manifold means is formed by said yoke,

a hood element upstanding from said base and overlying said well at a height above said paint pail,

said hood includes a hook means for engaging and hanging said paint roller by its manifold in upright position,

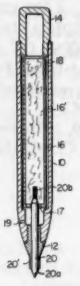
said hood element includes a top aperture and a grippable element whereby a hand inserted through the aperture can grip the grippable element for purposes of moving said carriage.

4,072,430

WRITING INSTRUMENT

Katsumi Otsuka, Funabashi, Japan, assignor to Teibow Company Limited, Japan

Filed Aug. 6, 1975, Ser. No. 602,402
Claims priority, application Japan, Sept. 6, 1974, 49-107271[U]
Int. Cl.[2] B43K *1/06*
U.S. Cl. 401—265 **11 Claims**



1. In a writing instrument comprising a cylindrical casing having a rear end and a forward end, an ink reservoir in said casing, and a writing nib having a rear end in said ink reservoir and a forward end projecting from the forward end of said casing, said nib having a tapered tip portion extending forwardly from said forward end of the casing, the improvement wherein said nib comprises an outer wall of cylindrical shape and a plurality of inner partitions formed integral with said outer wall in cantilever fashion, each said inner partition having a transverse cross-section which is comprised of a plurality of partially intersected circles of different diameter aligned radially in such a manner that the intersected circles of larger diameter and of smaller diameter are arranged alternately, each intersected circle of each inner partition being spaced circumferentially on a concentric circle coaxial with said outer cylindrical wall from the corresponding intersected circle having the same diameter of the neighboring inner partition, so that an inner capillary conduit for ink comprised of a plurality of capillary passages of various transverse dimensions is defined between said outer cylindrical wall and said inner partitions, one end of said inner capillary conduit for the ink terminating at said tapered tip portion of the nib and the other end terminating at said rear end of the nib, whereby said ink contained in said ink reservoir is introduced from said reservoir to said inner capillary conduit and can flow to said tip portion through said capillary passages of various dimensions, so that the ink

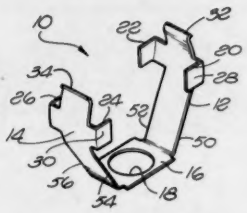
flows smoothly and continuously to said tip through the capillary conduit upon the consumption of ink due to the use of said writing instrument.

4,072,431

ANTIROTATION CLIP

William J. Waight, Reseda, and Stanley E. Roche, Granada Hills, both of Calif., assignors to Textron Inc., Valencia, Calif.

Filed Apr. 5, 1977, Ser. No. 784,895
Int. Cl.[2] F16C *11/06*; F16J *1/14*
U.S. Cl. 403—158 **6 Claims**



1. An anti-rotation spring clip adapted for attachment to an object to prevent rotation thereof in a predetermined axis, said clip comprising:

a unitary U-shaped member having first and second arms interconnected by a bight portion;

said first arm having first and second spaced apart opposed inwardly directed tabs thereon;

said second arm having third and fourth spaced apart opposed inwardly directed tabs thereon; and

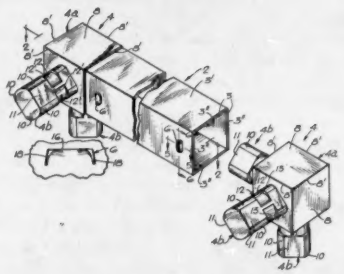
said tabs each having an outer bearing surface.

4,072,432

CONNECTOR FOR TUBULAR FRAME MEMBERS

Paul M. Levy, Skokie, Ill., assignor to Capitol Hardware Manufacturing Company, Inc., Chicago, Ill.

Filed May 6, 1976, Ser. No. 683,819
Int. Cl.[2] F16B *7/22*
U.S. Cl. 403—170 **12 Claims**



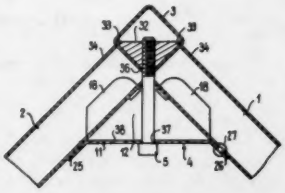
1. In combination with a tube connector fitting for interconnecting substantially square open-ended tubes each having an interior defined by two pairs of orthogonally related parallel flat surfaces spaced apart a given distance, said tube connector fitting comprising a hub portion having tube-receiving projections extending in different directions from said hub portion, said hub portion forming tube end abutment surfaces immediately about the points said tube-receiving projections extend from said hub portion, each of said tube-receiving projections having diametrically opposed portions of maximum spacing which fit loosely within said square tube in one angular position of insertion into the tube and frictionally engaged the interior surfaces of said tube when the inserted connector fitting or tube receiving the same is rotated 45° therefrom, each of said tube-receiving projections having diametrically opposed portions of lesser spacing between said diametrically opposed portions of maximum spacing which portions of lesser spacing provide clearance for the passage of internally projecting flexible resilient locking means on one of the square tubes when the tube connector fitting has said one angular position of insertion with respect thereto, and grooves formed in and extending transversely of the longitudinal axes of said tube-receiving projections which grooves are defined by recessed radially outwardly facing surfaces which at their outermost margins intersect radially outwardly extending tube projection locking shoulders, said grooves being in axial alignment with said diametrically opposed projection portions of maximum spacing, said recessed radially outwardly extending groove surfaces being spaced a greater distance from the center of the associated tube-receiving projections than the portions thereof between said recessed groove surfaces, to form locking projection deforming means when forced against the outer side surfaces of said resilient locking means of one of said tubes upon said 45° rotation of the same; the improvement comprising open-ended square tubes inserted over said connector fitting projections, each of said square tubes having adjacent the opposite ends thereof inwardly projecting flexible resilient tongues extending longitudinally away from the adjacent tube axes and each of which present at each side thereof facing transversely of the longitudinal axis of the tube curved surfaces either of which is engagable by said recessed radially facing groove surface of said fitting when the tube is inserted fully over a fitting projection, each tongue having a length to extend somewhat beyond the point of the connector fitting projection adjacent to where the associated groove-formed locking shoulder is located when the tube is in said fully inserted position so that the adjacent groove surface engages one of said curved surfaces of the adjacent tongue and inwardly deforms and shortens axially said tongue to cause it to enter the adjacent connector fitting projection groove and resiliently engage said groove-forming locking shoulder thereof when the connector fitting or tube is rotated 45° to bring the tube and connector fitting into their frictionally engaging positions, the entry of the tongue into the groove drawing the connector fitting and tube axially together to bring the end of the tube into abutment with said tube end abutment surface of the connector fitting hub portion.

4,072,433

THREE-TUBE CORNER JOINT

Wolf Veyhl, Zwerenberg, Germany, assignor to Veyhl-Produktion KG, Zwerenberg, Germany

Filed Apr. 6, 1976, Ser. No. 674,100
Claims priority, application Germany, Apr. 10, 1975, 2515569
Int. Cl.[2] F16D *1/00, 3/00*
U.S. Cl. 403—172 **21 Claims**



1. In a joint assembly for three tube sections forming the corner of a tube frame, including

a. a first tube section having a first inner side, a second outer side, and two opposing walls which are perpendicular to the first side;

b. a second tube section having a first inner side, a second outer side, and opposing walls which are perpendicular to the first side, said first and second tube sections being

located in a common plane, the first side of said first section and the first side of said second section mutually facing each other;

c. a third tube section which is arranged perpendicularly to said common plane, and having a plurality of walls including two adjoining lateral faces, with the ends of the first and second tube sections being pressed against said two adjoining lateral faces by a tensioning bolt; and

d. a tensioning piece having ends which are hooked into openings provided in the mutually facing sides of the first and second tube sections, said tensioning bolt extending through a hole in said tensioning piece and engaging in a diagonally disposed threaded hole of the third tube section;

the improvement wherein:

the mutually facing sides of the first and second tube sections are exclusively restrained at locations which are immediately adjacent to the two opposing walls of the first and second tube sections;

the tensioning piece has a U-shaped cross section in a plane which is perpendicular to the common plane in which the first and second tube sections are located, said tensioning piece includes a transverse web extending transversely to the first and second tube sections and two spaced-apart legs which are parallel to said common plane in which the first and second tube sections are located, said U-shape being defined by said transverse web and said two spaced-apart legs; the mutually facing sides of the first and second tube sections have slots immediately adjacent to the opposing walls, the legs of the tensioning piece have boundary portions which engage in these slots; the bolt bears against the transverse web of the tensioning piece; and

the legs of the tensioning piece are provided with slots, and the mutually facing sides of the first and second tube sections have wall portions which engage in the slots in the legs.

4,072,434

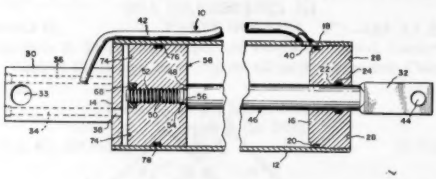
HYDRAULIC CYLINDER WITH CONCENTRICALY MAINTAINED PISTON AND ROD

Kenneth C. Homuth, 1885 E. Old Shakopee Road, Bloomington, Minn. 55437

Continuation-in-part of Ser. No. 637,362, Dec. 3, 1975, abandoned. This application Jan. 24, 1977, Ser. No. 761,609

Int. Cl.[2] F16B *9/00*

U.S. Cl. 403—263 **7 Claims**



1. In a hydraulic cylinder of the type having a piston and rod threadably attached, the improvement comprising

a. a shoulder on said rod abutting against a first piston surface and a threaded stem extending from said shoulder in threaded engagement through said piston;

b. a counterbore in a second piston surface axially aligned with the piston threaded stem engagement portion; and

c. a deformable ring sized for interference fit into said counterbore and having a narrowed inner circumference comprising a circumferential rib of minimum width less than the thread pitch of said threaded stem, and sized for self-tapping engagement with said threaded stem.

4,072,435

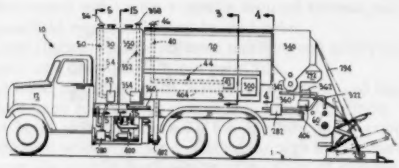
METHOD AND APPARATUS FOR MAINTAINING HIGHWAYS

Ralph W. Coho; John L. Kugle, both of Lancaster, and Robert C. Futty, Willow Street, all of Pa., assignors to IRL Daffin Associates, Inc., Lancaster, Pa.

Filed Nov. 11, 1976, Ser. No. 741,060

Int. Cl.[2] E01C *19/10*

U.S. Cl. 404—110 **21 Claims**



13. A self-contained highway maintainer apparatus comprising, in combination:

an elongated mobile frame having a longitudinal axis;

a storage bin disposed on said frame for storing aggregate;

a first tank disposed on said frame for storing liquid asphalt cement;

a first heating means disposed in said storage bin for maintaining the aggregate at a temperature of from about 70° F to about 250° F;

a second heating means disposed in said first tank for maintaining the liquid asphalt cement at a temperature of from about 100° F to about 195° F;

mixing means attached to said frame including a plurality of mixer elements;

delivery means having a length disposed to receive the aggregate fed from said storage bin and discharge the same into said mixing means;

pump means coupled to said first tank for discharging the liquid asphalt cement from said first tank into said mixing means; and

a spreading means connected to said frame and disposed below said mixing onto a road surface;

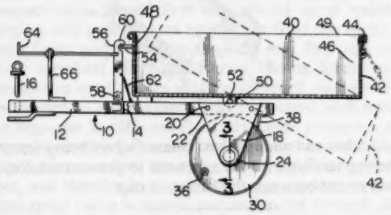
said mixing means includes at least three mixing elements aligned perpendicularly to said longitudinal axis of said frame, each of said mixing elements being operatively associated with another, the first mixing element comprising a first shaft having a longitudinal center, and a plurality of first mixing blades in spaced apart relationship on said first shaft, said mixing blades being disposed on said first shaft to direct the materials being mixed towards the longitudinal center of said first shaft, the second mixing element comprising a second shaft aligned parallel to and on the same horizontal plane as said first shaft having a longitudinal center and opposite ends, said centers of said first and second shafts being aligned along the longitudinal axis of said frame, a plurality of second mixing blades disposed on said second shaft in spaced apart relationship and aligned on said second shaft to direct the materials being mixed towards the ends of said second shaft, the third mixing element comprising an auger-conveyor aligned parallel to and directly below said second mixing element having opposite ends and a longitudinal center, said auger--conveyor being arranged to direct the materials being mixed from the ends thereof towards the longitudinal center thereof, and drive means for rotationally driving said mixing elements.

4,072,436

IMPLEMENT, ESPECIALLY FOR LAWN WORK

Bobby G. Wolf, R.R. No. 2, Box 59, Lafontaine, Ind. 46940

Filed Dec. 9, 1976, Ser. No. 749,169
Int. Cl.[2] E01C *19/26*
U.S. Cl. 404—122 8 Claims



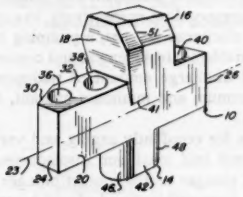
1. An implement for use in lawn work comprising: a generally horizontal frame having forward and rear ends, a hitch on said forward end, a cylindrical roller rotatably connected to said frame toward said rear end thereof and having an axis of rotation extending transversely of said frame, an upwardly opening cargo body having a forward end and an open rear end, said body being tiltably mounted on said frame above said roller, said roller being positioned beneath the center portion of the length of said body and being substantially the sole ground support for said body, and gate means pivotally connected to said body for opening and closing said rear end thereof.

4,072,437

REMOVABLE CUTTER TOOTH

Garland Y. Smith, Hinsdale; Gerald R. Scott, Elmhurst; George A. Blazek, Woodridge, and John L. Kowalski, Downers Grove, all of Ill., assignors to Garland Smith Engineering Co., Inc., Hinsdale, Ill.

Filed June 24, 1976, Ser. No. 699,427
Int. Cl.[2] B26D *1/00, 1/12;* B23B *41/02*
U.S. Cl. 407—118 6 Claims



1. A removable tooth for use with a cylindrical tooth carrier for cutting a coupon comprising: a substantially rectangular base having a pair of parallel faces, a plurality of midpoints between said parallel faces defining a central longitudinal axis, a first relief and a second relief formed integral with one face of said pair of parallel faces, each of said reliefs being positioned at an acute angle to said central longitudinal axis; a thrust pin formed integral with the substantially rectangular base at a third face of said substantially rectangular base and being adapted to engage a first portion of a cylindrical tooth carrier; an upstanding rib formed integral with a fourth face of the substantially rectangular base; a cutting insert connected to the substantially rectangular base and to the upstanding rib, said cutting insert being adapted to engage cuttingly a surface to be machined; and a plurality of apertures, each aperture being adapted to receive a machine screw, said plurality of apertures being positioned in said substantially rectangular base

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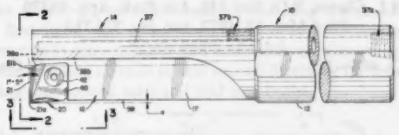
4,072,438

INSERT TYPE DRILL AND INSERT THEREFOR

Thomas R. Powers, Rogers, Ark., assignor to TRW Inc., Cleveland, Ohio

Filed July 26, 1976, Ser. No. 708,836
Int. Cl.[2] B23B *29/03;* B26D *1/00, 1/12*
U.S. Cl. 408—59 13 Claims



1. A drill useful for performing a variety of metal removal operations comprising:

an elongated, generally cylindrical body having a longitudinal axis and terminating in first and second axially opposed ends;

a slot extending from said first end a substantial distance axially along said body, said slot having a generally v-shaped cross-section in planes perpendicular to said axis and having a radial depth greater than the radius of the body;

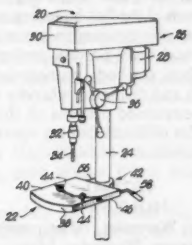
a hard cutting indexable insert mounted in said slot at the end thereof adjacent said first end of said body, said insert including first and second intersecting faces which define a continuous cutting edge that extends from the axis of said body to a point slightly beyond the radial extent of said body, all points along said cutting edge being axially outwardly of the first end of said body with the radially inner end of said cutting edge being located axially inwardly of its radially outer end to provide the drill with a negative lead, and the first face being positioned to provide the cutting edge with effective neutral rake.

4,072,439

SAFETY GROOVE DRILL PRESS AND ATTACHMENTS

Richard E. Diggs, P.O. Box 776, Carthage, Mo. 64836

Filed May 18, 1976, Ser. No. 687,523
Int. Cl.[2] B23B *39/00;* B23D *7/08*
U.S. Cl. 408—90 8 Claims



1. In a drill press having a work-supporting table and a powered cutter above the table reciprocable toward and away from the latter, said table and said cutter being relatively swingable in an arcuate path of travel intersecting the reciprocative path of the cutter, the improvement including:

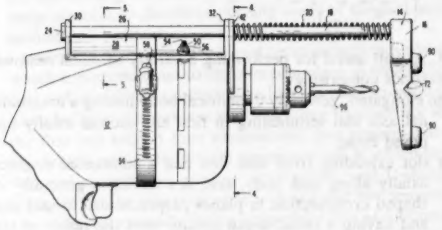
structure on said table defining a continuous, arcuate, recessed groove in the surface of the table, said groove facing the cutter and being disposed directly below the latter,

said groove extending parallel to the path of relative movement between said table and said cutter,
said structure including a protector strip facing said cutter and defining the bottom of said groove,
said strip being comprised of material which is harder than said cutter whereby to prevent damage to said structure when the latter comes in contact with said cutter.

4,072,440
GUIDE ATTACHMENT FOR PORTABLE POWER DRILLS

Robert L. Glover, P.O. Box 335, Ash Fork, Ariz. 86320

Filed Mar. 11, 1977, Ser. No. 776,713
Int. Cl.[2] B23B *45/14*
U.S. Cl. 408—112 **12 Claims**



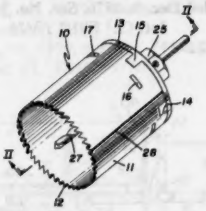
1. In a universal drill guide assembly for use with hand-held power drills, comprising, in combination,
a base having a pair of parallel laterally spaced guide rods projecting from one surface thereof,
a drill support assembly adapted to be releasably mounted on a drill housing, such drill support assembly being moveably mounted on the guide rods to support the drill for movement toward and away from the base,
spring means normally urging the drill support assembly away from the base,
the base including a plate member having a central opening therethrough through which the bit of a drill may pass when the drill guide is mounted on a drill, the plate member having a flat surface on the side opposite the guide rods and extending perpendicular to the axis of the guide rods, a plurality of bores formed in the base from the flat surface, the bores being disposed in a predetermined pattern relative to the opening and to the axis of the guide rods,
and a plurality of feet mounted one in each of at least selected ones of the bores and projecting outwardly from the flat surface, each of the feet including mounting means adapted to be releasably retained in one of the bores and a generally cylindrical body portion projecting outwardly from the flat surface, the body portions being of substantially equal length and diameter, whereby the feet may be arranged in predetermined patterns on the flat surface to adapt the guide for different drilling operations.

4,072,441
HOLE SAW

Gabriel M. LaPointe, Worcester, Mass., assignor to Parker Manufacturing Company, Worcester, Mass.

Filed Apr. 15, 1976, Ser. No. 677,381
Int. Cl.[2] B23B *51/04*
U.S. Cl. 408—204 **4 Claims**

1. Hole saw, comprising:
a. a hardened metal tube having teeth formed at one end edge,
b. a cap formed of a tough polymer fitted to the other end of the tube, and
c. means locking the cap and the tube together in driving relationship, the means consisting of axially-extending notches formed on the said other end of the tube and torque lugs laterally formed on the cap to fit snugly in the notches, apertures being formed on the tube adjacent the

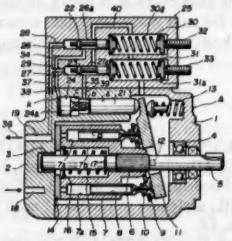


said other end and resilient detent fingers being formed on the cap to snap into the apertures to prevent relative axial movement between the tube and cap.

4,072,442
VARIABLE DELIVERY HYDRAULIC PUMP

Takeshi Horiuchi, 9-305, Lot 8, Hiratadai, Ibaraki, Osaka, Japan

Filed June 29, 1976, Ser. No. 700,953
Claims priority, application Japan, July 4, 1975, 50-82871; Mar. 15, 1976, 51-28458; Apr. 6, 1976, 51-38904
Int. Cl.[2] F04B *1/26*
U.S. Cl. 417—218 **11 Claims**



1. In a variable delivery hydraulic pump including a housing having a suction and a discharge conduit, a variable control element movable between maximum and minimum displacement positions corresponding, respectively, to a maximum and a minimum fluid discharge amount, a pumping means associated with said variable control element and controlled thereby to vary the fluid discharge amount of said pumping means between said maximum and minimum amount, the improvement comprising:
a biasing means for constantly urging said variable control element toward said maximum displacement position, a bore, a pilot plunger and a control plunger slidably disposed in said bore with one end of said control plunger in operative engagement with said variable control element for adjusting said displacement position thereof from said maximum to said minimum against the urging of said biasing means, said pilot plunger being slidable with one end thereof in engagement with the other end of said control plunger through a stroke distance to thereby move, engaged with said control plunger, said variable control element from said maximum displacement position to an intermediate displacement position between said maximum and minimum positions, to vary said fluid discharge amount from said maximum amount to a medium amount, said control plunger being slidable through a stroke distance to move said variable control element from said intermediate displacement position to said minimum displacement position to vary said fluid discharge amount from said medium amount to said minimum amount,
means for controlling the sliding movement of said pilot and

control plungers including first and second spool valves each disposed for axial movement in a spool chamber, each spool chamber having one end thereof in fluid communication with said discharge conduit of said pumping means, so that said spool valves will be exposed to the fluid discharge pressure of said pumping means, first and second push members disposed at the other ends of said first and second spool chambers for engaging the ends, respectively, of said first and second spool valves for urging said spool valves against the fluid discharge pressure from said discharge conduit, said first and second push members exerting different biasing forces on said respective spool valves so that said spool valves will each be caused to move against said respective push members in response to different fluid discharge pressures, a first control conduit for establishing fluid communication from a point intermediate the said ends of said first spool chamber, and thereby from said discharge conduit when said first spool valve is moved past said point towards its said other end, to the other end of said pilot plunger in said bore when said fluid discharge pressure exceeds a medium level to overcome the biasing force of said first push member, a second control conduit for establishing fluid communication from a point intermediate the said ends of said second spool chamber, and thereby from said discharge conduit when said second spool valve is moved past said point in said second spool chamber toward its said other end, to a point in said bore between said pilot and control plungers when said fluid discharge pressure exceeds a maximum level to overcome the biasing force of said second push member, the biasing force of said first and second push members being such that said spool valves will be moved thereby to close off said first and second control conduits from said fluid discharge conduit when said fluid discharge pressure is lower than said medium level whereby said biasing means will move said variable control element to its said maximum displacement position to cause said pumping means to discharge said maximum amount of fluid.

4,072,443

CONTROL VALVE ARRANGEMENTS FOR VARIABLE STROKE PUMPS

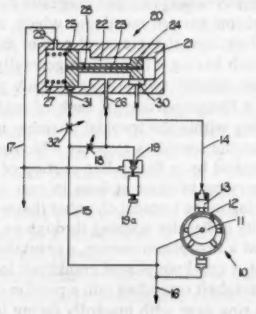
Ronald Alfred Heath, Birmingham, England, assignor to Lucas Industries Limited, Birmingham, England

Filed Sept. 22, 1976, Ser. No. 725,435

Claims priority, application United Kingdom, Oct. 4, 1975, 40705/75

Int. Cl.² F04B *49/08*

U.S. Cl. 417—218 **5 Claims**



1. A control valve arrangement for a variable-stroke positive displacement pump which includes a stroke-varying device operated by a servo pressure, said control valve arrangement comprising a body having a bore, a spool control element slidable in said bore, first and second inlets communicating with said bore, means for applying to said first inlet an operating pressure derived from the outlet pressure of said pump, means for connecting said second inlet to the outlet of said pump, said operating pressure urging said control element in a first direction, means biasing said control element in a second direction against said operating pressure, a first outlet for connecting said bore to a low pressure, a second outlet communicating with said bore, said control element being operable to derive said servo pressure at said second outlet from the pressures at said first inlet and said first outlet, movement of said control element in said first direction acting to vary the servo pressure at said second outlet in a sense to reduce the stroke of said pump, and means for reducing the pressure at said first inlet, said spool control element including means responsive to movement of said control element by more than a predetermined amount in said second direction for interconnecting said second inlet and said first outlet.

4,072,444

AXIAL PISTON PUMPS

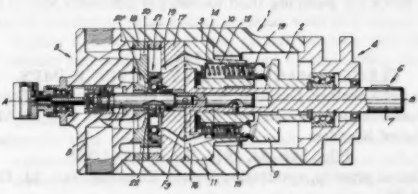
Georges J. Kaiser, Chenee, Belgium, assignor to Fabrique Nationale Herstal S.A., Herstal-lez-Liege, Belgium

Filed May 24, 1976, Ser. No. 689,464

Claims priority, application Belgium, May 30, 1975, 254376

Int. Cl.² F04B *1/14*

U.S. Cl. 417—269 **3 Claims**



1. In an axial piston pump which includes a shaft, at least a plurality of annularly distributed pistons housed in cylinders of a fixed block and in permanent contact with an inclined plate fixed to the pump shaft, an annular rotatable valve mounted on an eccentric fixed to said shaft, inlet and outlet means in the block for the cylinders and means for ensuring an axial hydrostatical compensation, the improvement wherein said means comprise, for each piston housing, a pocket provided in said block and an axially movable bobbin housed in said pocket; and additionally comprising a continuous annular flange carried by said shaft of the pump and forming with each said bobbin a respective balancing recess, said pockets and said bobbins facing said annular flange carried by said shaft of the pump with said bobbins when sliding being in contact with a continuous surface of said flange, said recesses being formed exclusively by said bobbins and said continuous annular flange.

4,072,445

ROTARY GAS PRESSURE ENGINE SYSTEM

Johnny L. Hay, 1001 Willow Ridge Road, Fort Worth, Tex. 76103

Filed July 26, 1976, Ser. No. 708,895

Int. Cl.² F04B *17/00, 35/00;* F01B *13/06*

U.S. Cl. 417—379 **15 Claims**

1. A rotary gas pressure engine comprising:

a housing;

a stationary shaft extending through said housing;

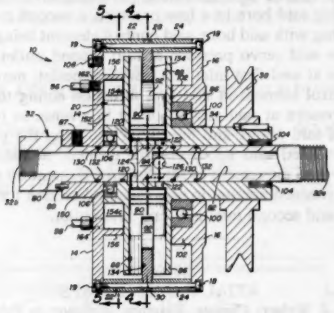
a circular cylinder block rotatably mounted on said stationary shaft;

said cylinder block including a plurality of radial piston cylinders formed therein;

said housing including a circumferentially mounted cam ring having generally elliptical risers around its inner periphery;

a plurality of pistons mounted for slidable movement within said piston cylinders and including means for bearing against said cam ring;

drive means connected to said cylinder block and extending external of said housing for driving a power take-off;



a gas generator for supplying gas to said cylinder block to cause movement of said pistons and rotation of said cylinder block; and

means within said housing and rotatably with said cylinder block for pumping fluid to said gas generator.

4,072,446

ELECTROMAGNETICALLY DRIVEN PUMPS

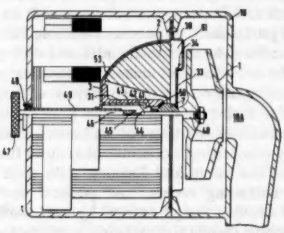
Alan John Walker, Dornoch, Scotland, assignor to R. E. Dupont Research and Investment Services Limited, Isle of Man, United Kingdom

Filed Feb. 24, 1976, Ser. No. 661,038

Claims priority, application United Kingdom, Jan. 20, 1976, 2150/76

Int. Cl.[2] F04B *17/00*

U.S. Cl. 417—420 **8 Claims**



1. An electromagnetically driven pump comprising:

a casing adapted to house a rotatable unit comprised by an impeller and an armature and having a fluid-inlet opening to lead fluid into the casing to the impeller in a direction parallel to the impeller axis of rotation;

a stator having a frusto-spherical magnetically effective surface complementary to that of the armature and spaced therefrom to form an air gap;

frusto-spherical bearing means for said rotatable unit said means having its convex part rotatable with the said unit and its concave part non-rotatably mounted;

a fluid-tight wall of frusto-spherical formation and of magnetically permeable material fixedly located in the air gap between the armature and the stator; and

an annular second wall extending generally radially between the impeller and the armature, said second wall comprising an outer annular portion and an inner rotary frictional seal means arranged to be operative between said second wall outer portion and said rotatable unit and to be resiliently urged in a direction parallel to the axis of rotation of the machine and to allow appreciable precessional freedom of motion of the axis of rotation of the rotatable unit about the geometric centre of the frusto-spherical bearing means, said seal means comprising an annular resilient portion of which the inner margin bears frictionally upon and in sealing contact with the convex part of said bearing means upon which said margin additionally exerts thrust upon said convex part in a direction parallel to the axis of rotation thereof;

the stator, rotatable unit, bearing and seal means all being constructed and assembled so that in their spherical relationship they are concentric.

4,072,447

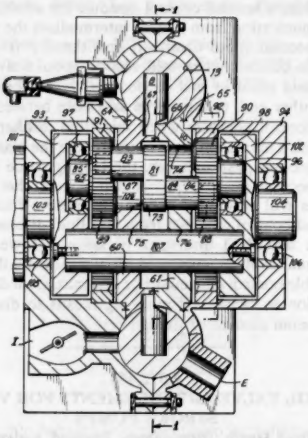
ALTERNATING PISTON ROTARY APPARATUS

Peter Gaspar, 1567 Parker Ave., Fort Lee, N.J. 07024

Continuation-in-part of Ser. No. 375,706, July 2, 1973, abandoned. This application Mar. 8, 1976, Ser. No. 664,513

Int. Cl.[2] F01C *1/00*; F04C *17/00*; F02B *55/14*

U.S. Cl. 418—36 **15 Claims**



1. Rotary apparatus having a casing shaped to form generally a toroidal hollow annular chamber therein, said casing having an opening into said chamber which is circularly continuous about the central axis of the torus, inlet and exhaust means through the structure that defines the toroidal chamber and communicating with that chamber, said apparatus also having two generally wheel-like and generally figure of revolution shaped piston carrier members, which are mounted rotatably with their axes at the central axis of the torus, said piston carriers each having a flange-like generally continuous peripheral portion, exactly two pistons on each piston carrier and carried by a flange portion of each of said two piston carriers and fitting within the toroidal chamber in alternating occurrence about the toroid as respects which piston carrier each piston is carried by, a flange-like portion of each of said piston carriers serving to close at least in part the circularly continuous opening in the toroidal chamber that was left by the casing, a generally radial slot opening through an intermediate portion of at least a first piston carrier, a crankshaft extending through said slot, a crankpin of said crankshaft located in said slot, and said crankshaft extending into a portion of the second piston carrier, a ring gear with inwardly facing teeth fixed to the casing concentric with the central axis, a gear wheel operatively connected to said crankshaft and having a pitch diameter one half of the ring gear's and mounted within the ring gear and meshing with it and having its teeth sweep through the central axis, leaving a crescent shaped empty space between the ring gear and the gear wheel that has half its diameter, a

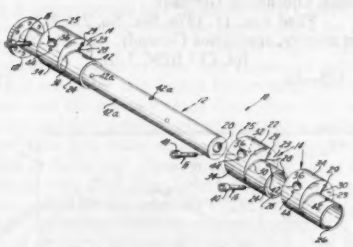
rotary header member to that side of the ring gear which is farther from the first piston carrier, said rotary header member being journaled for rotation about the central axis and having secured in it the crankshaft's axial journal, whereby this rotary header member rotates at the same rate as the revolutions of the crankshaft bodily (as distinguished from the crankshaft's rotations), a functionally similar rotary header member being provided beyond the ring gear, to the opposite side from the first mentioned header member and mounted for rotation about the central axis, said rotary apparatus also including at least one other member that passes through the crescent-shaped open space and secures the two opposite header members to each other, for firmly securing the two headers against relative motion or looseness of either with respect to the other, the headers and connected parts that rotate with the constituting a drum assembly.

4,072,448

BUILT-UP MAINSHAFT FOR MULTI-UNIT ROTARY MECHANISMS AND METHOD OF MANUFACTURE THEREOF

Robert W. Loyd, Jr., Wyckoff, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed May 7, 1976, Ser. No. 684,256
Int. Cl.[2] F01C *1/02;* G05G *5/16;* F16D *1/08;* F01L *1/34*
U.S. Cl. 418—60 **6 Claims**



1. A built-up mainshaft for a multi-unit rotary mechanism comprising:

a. an elongated shaft element of substantially uniform outside dimensions for substantially the entire length thereof;

b. a plurality of eccentric elements;

c. each eccentric element comprises:

c-1. a relatively rigid, generally cylindrical body portion for supporting a rotor;

c-2. a sleeve-like portion integral with the cylindrical body portion and extending with its axis parallel and radially offset from the axis of the cylindrical body portion;

c-3. a bore extending through the sleeve-like portion and cylindrical body portion and of a cross-sectional size and shape to receive therethrough said shaft element;

c-4. a slot in said cylindrical body portion and in the sleeve-like portion extending in a plane containing the longitudinal axis of said bore the full length of the cylindrical body portion and into the sleeve-like portion and radially to a point short of the outer periphery of the cylindrical portion;

c-5. scoring means in said sleeve-like portion adjacent the cylindrical body portion and extending in a plane normal to the plane containing the longitudinal axis of the bore and communicating with said slot; and

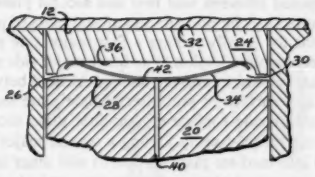
d. a clamping means for each eccentric element coacting with the said slot and scoring means to effect deformation of the cylindrical body portion and thereby cause the cylindrical body portion to embrace said shaft element in torque transmitting relationship.

4,072,449

COMBINED SEAL BIASING SPRING AND CHECK VALVE FOR ROTARY MECHANISMS

Paul J. Staebler, Dunlap, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 12, 1976, Ser. No. 666,521
Int. Cl.[2] F01C *19/04, 21/04;* F04C *27/00, 29/02*
U.S. Cl. 418—87 **5 Claims**



1. A rotary mechanism comprising:

a housing defining an operating chamber;

a rotor journalled within said chamber;

at least one seal receiving groove in said rotor;

a seal within said groove;

spring means within said groove and urging said seal into sealing engagement with said housing;

a source of oil under pressure;

an oil conduit in fluid communication with said source and ending in an opening in said groove beneath said spring means and positioned to be closed by said spring means; and

means whereby oil is directed to said conduit in pressurized pulses;

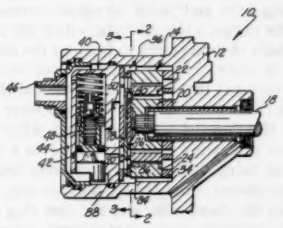
whereby said spring means additionally serves as a check valve opening to permit oil to enter said groove when oil under pressure is directed to said conduit and preventing pressurized gas from entering said conduit from said chamber.

4,072,450

PUMP ASSEMBLY

Robert E. Carlson, Livonia, Mich., assignor to TRW Inc., Cleveland, Ohio

Filed Jan. 12, 1976, Ser. No. 648,474
Int. Cl.[2] F04C *15/00*
U.S. Cl. 418—133 **14 Claims**



2. A pump assembly comprising a body member having a bore which at least partially defines a pumping chamber, a rotatable rotor disposed in said pumping chamber, said rotor cooperating with said bore to form two separate working areas, and pressure plate means for at least partially defining a pair of inlet ports through which fluid flows into said working areas during rotation of said rotor in said pumping chamber and a pair of outlet ports through which fluid flows from said working areas during rotation of said rotor in said pumping chamber, said pressure plate means including a plurality of plate sections having major and minor side surfaces and which cooperate to at least partially define said pairs of inlet and

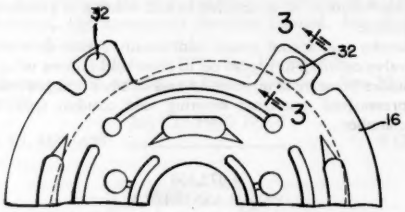
outlet ports, said plurality of plate sections includes a first plate section having an outer major side surface disposed in abutting engagement with said body member, a second plate section having inner and outer major side surfaces extending parallel to the outer major side surface of said first plate section, and an intermediate plate section disposed between said first and second plate sections, said intermediate plate section including surface means cooperating with an inner major side surface of at least one of said first and second plate sections to form a passage disposed between said first and second plate sections and interconnecting the ports of one of said pairs of ports, first joining means for fixedly joining a first major side surface of said intermediate plate section to an inner major side surface of said first plate section to prevent leakage of fluid between said first major side surface of said intermediate plate section and said inner major side surface of said first plate section, and second joining means fixedly joining a second major side surface of said intermediate plate section to said inner major side surface of said second plate section to prevent leakage of fluid between said second major side surface of said intermediate plate section and said inner side surface of said second plate section.

4,072,451

POWER TRANSMISSION

Albin Joseph Niemiec, Sterling Heights, Mich., assignor to Sperry Rand Corporation, Troy, Mich.

Filed Oct. 12, 1976, Ser. No. 731,277
Int. Cl.[2] F04C *29/00*
U.S. Cl. 418—178 **2 Claims**



1. A rotary sliding vane pump or motor having a body comprising a central cam ring having circular arcs of major and minor diameters alternately spaced around its inner cam surface and connected by ramps along which fluid displacement can occur, said body further comprising end covers, means forming inlet and outlet terminals connected respectively with the ramps, a slotted rotor within the cam ring and carrying radially slidable vanes to traverse the inner cam ring surface, one or more cheek plates interposed between one or both end covers and the rotor, the vanes, and the stationary cam ring, the cheek plate or plates having a wear face of bearing material abutting the rotor and vanes wherein the wear face is a layer of bearing material formed on a harder metal back, the back being deformed over discrete limited areas to provide wearresistent contacts with the cam ring, whereby the wear between the cheek plate and the cam ring as it radially expands and contracts under intermittent pressure loads is reduced.

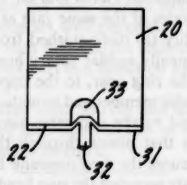
4,072,452

ROTARY COMPRESSOR VANE WITH BUILT-IN SPRING

Rajesh N. Sheth, Mt. Prospect, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed July 27, 1976, Ser. No. 709,065
Int. Cl.[2] F04C *29/00*; F16F *1/46*
U.S. Cl. 418—266 **3 Claims**

1. A rotary compressor of the type including a cylindrical rotor having a plurality of extensible vanes received in complementary vane slots, a vane, an elastomeric spring means fastened to the radially inner edge of said vane, and means for



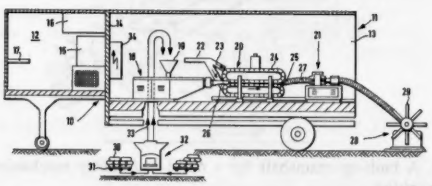
applying tensile stress to stretch said elastomeric spring means responsive to a radially inward movement of said vane.

4,072,453

PLANT FOR THE PRODUCTION OF TUBULAR OR HOSE-LIKE ARTICLES OF SYNTHETIC MATERIAL

Heinrich Oltmanns, Jeddeloh, and Klaus Volckmann, Bad Zwischenahn, both of Germany, assignors to Ziegelwerke Heinrich Oltmanns, Oldenburg, Germany

Filed Aug. 11, 1976, Ser. No. 713,337
Claims priority, application Germany, Aug. 21, 1975, 2537184
Int. Cl.[2] B29C *3/02*
U.S. Cl. 425—62 **11 Claims**



1. A mobile unit for the continuous production of plastic tubes, particularly corrugated tubes for draining purposes, comprising:

an elongated, wheeled, vehicular platform (**10**) having an enclosure (**11**) mounted thereon and enclosing same;

an extruder (**18**) for plastic material mounted on said platform;

a molding device (**20**) mounted on said platform, said molding device including a pair of rotatable loops (**24, 25**) of chainlike connected dies (**53**) abuttable along a common rectilinear portion located at the output of said extruder;

mold cooling means including cooling passages (**55-58**) in said dies having inlets and outlets (**59, 60**), a pair of loops of flexible cooling lines (**61,62**), one of said cooling lines being connected to said inlets and the other of said cooling lines being coupled to said outlets of said cooling passages, said pair of loops of cooling lines being rotatable with said loops of dies, and swivelable coupling means operatively associated with said rotatable cooling lines (**65**) for connecting said rotatable cooling lines to a stationary source of coolant (**50**);

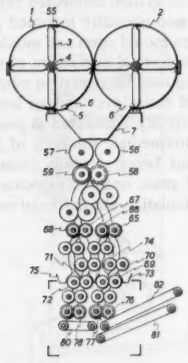
a punching device (**21**) mounted on said platform at the output of said molding device for applying apertures to the extruded and molded tube; and

power supply means (**15**) energizing said extruder, said molding device, said mold cooling means, and said punching device.

4,072,454
AUTOMATIC NOODLE MACHINE

Ren Jen-Shuy, No. 227, Min Sheng District, Lu Chou Village, Taipei Hsien, China /Taiwan

Filed Apr. 28, 1975, Ser. No. 572,396
Int. Cl.[2] A21C *11/22*
U.S. Cl. 425—101 5 Claims



1. An automatic noodle machine comprising: two blenders in which the axis is horizontal and containing rotary blades secured to a shaft which are utilized for mixing the flour powder and water homogeneously by changeable rotary speed; outlets and related outlet closing means on said blenders for flowing out the blended flour paste into a funnel; means controlling said outlet closing means to open their respective outlets; first pressing roll set under said funnel for pressing said blended flour paste into the primary thick flour slice; first inserting cutter under said first pressing roll set for cutting said primary thick flour slice into many equal wide flour strips; a guide board close to the trough of said first inserting cutter separating said equal wide flour strips from said first inserting cutter; distributor under said first inserting cutter for distributing said equal wide flour strips into two courses to enter into second pressing roll set for to be thinned once more; second inserting cutters and their related guided boards under said second pressing roll set for cutting said flour strips which come from said second pressing roll set into many equal wide flour strips; distributors under said second inserting cutter for distributing one course of the flour strip which comes from said second inserting cutter into two courses again and entering them into third pressing roll sets which are set under said second inserting cutter; fourth pressing roll sets under said third pressing roll sets for piling up two courses of said flour strip which come from said third pressing roll sets into one course; dry flour powder container above said fourth pressing roll sets for releasing the dry flour powder onto the surface of said fourth pressing roll sets and thus the surface of said flour strips; fifth pressing roll sets under said fourth pressing roll sets for pressing the flour strips which come from said fourth pressing roll sets; third inserting cutter under said fifth pressing roll sets for cutting said flour strips which come from said fifth pressing roll sets into the noodles; belt conveyer for transporting said noodles out.

4,072,455
SPIRAL-LINE PRESS FOR THERMOPLASTIC SYNTHETICS

Erich Beck, Ingenieur, 652 Worms 27, Am See 29, Germany

Filed Oct. 21, 1975, Ser. No. 624,424
Claims priority, application Germany, Oct. 22, 1974, 2450030
Int. Cl.[2] B29F *3/06*
U.S. Cl. 425—133.1 2 Claims

1. A spiral-line press comprising:

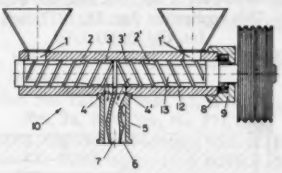
a support housing, a circularly driven shaft in said housing an axial bearing in said housing supporting said shaft, means provided so that said housing for the axial bearing is simplified and the space requirements can be reduced including;

said shaft defining first and second material conveying portions;

a first spiral conveyor on said shaft at said first material conveying portion;

a second spiral conveyor on said shaft at said second material conveying portion;

said first and second spirals are opposingly oriented on said



shaft for conveying material from opposite ends of said shaft along respectively corresponding portions;

said first and second spiral conveyors having respective length to diameter ratios of not more than 14:1;

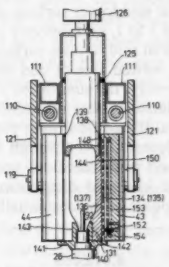
said first and second spiral conveyors defining corresponding metering zones where conveyed material is output from said press, wherein said metering zones have a phase depth of not more than 1/25 of said corresponding spiral diameter; and

means connected to said shaft for driving said spirals along with said shaft at a peripheral speed of at least 0.3 m/sec.

4,072,456
APPARATUS FOR BLOW-MOLDING HOLLOW ARTICLES, IN PARTICULAR BOTTLES

Adolf Appel, Egestorf-Nordheide, and Wolfgang Reymann, Hamburg, both of Germany, assignors to Heidenreich & Harbeck Zweigniederlassung der Gildemeister AG, Hamburg, Germany

Filed Oct. 1, 1976, Ser. No. 728,826
Claims priority, application Germany, Oct. 8, 1975, 2545133
Int. Cl.[2] B29D *23/03*
U.S. Cl. 425—183 5 Claims



1. A blow mold for forming a bottle having a longitudinal axis, comprising a pair of openable and closable blow mold blocks having their confronting faces provided with generally semi-cylindrical recesses, a generally semi-cylindrical mold insert snugly fitting in each recess, the two inserts having their inner faces contoured to cooperably define the shape of the bottle to be blown, the confronting faces of said mold blocks having a series of axially spaced, circumferential grooves therein opening freely onto the adjacent mold insert, the grooves extending around the inner periphery on the confronting faces of the mold blocks and terminating adjacent each

mold block edge, sealing means interposed between each of said inserts and its adjacent block to seal the edges of each insert to its block, and axially extending fluid passages in said blocks communicating with said grooves for circulating a heat exchange fluid through said grooves.

4,072,457

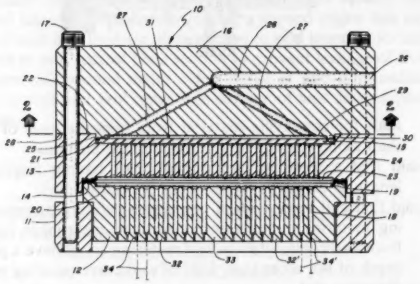
SPIN POT WITH IMPROVED TOP CAP

James Judson Cooksey, Colonial Heights, and Garland Linwood Turner, Chesterfield, both of Va., assignors to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 612,389, Sept. 11, 1975, abandoned. This application Jan. 21, 1977, Ser. No. 760,880

Int. Cl.[2] D01D *3/00*

U.S. Cl. 425—192 S **11 Claims**



3. A top cap, for use in conjunction with a spin pack assembly for the extrusion of synthetic filaments, comprising:

A. a flow inlet passage, said flow inlet passage bringing molten polymer to an area the central axis of which substantially coincides with the central axis of said top cap; and

B. a plurality of substantially identical polymer delivery channels, said delivery channels communicating with said flow inlet passage at said area and branching radially therefrom at substantially equal intervals through said top cap to open at the lower surface of said top cap into a distribution space for said spin pack assembly, the cross-sectional area of each of said delivery channels remaining substantially uniform along its respective length, the number of said delivery channels being between three and 80 and the ratio of said number of said delivery channels to twice the distance in inches between said central axis and the inner edge of any one of said delivery channels at said lower surface of said top cap being between 1 to 2 and 3 to 1, said delivery channels opening in the peripheral 50% of said bottom surface which is disposed above the internal wetted area of said distribution space for said spin pack assembly, the sum of the cross-sectional areas of said delivery channels being substantially the same as the cross-sectional area of said flow inlet passage;

whereby molten polymer flows through said top cap under identical pressures and with identical residence times to be uniformly distributed into said distribution space where the flow of said molten polymer is substantially laminar.

4,072,458

MOULD CARRIER

Alfred Schlieckmann, Lindau, Germany, assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Oct. 17, 1975, Ser. No. 623,424

Claims priority, application Germany, Dec. 2, 1974, 2456949

Int. Cl.[2] B29C *1/16*

U.S. Cl. 425—451.6 **10 Claims**

1. A mould carrier for complementary mould halves of a mould particularly adapted for use in making polyurethane foam products, which comprises in combination

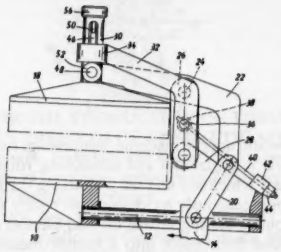
a mould carrier frame;

lower and upper platens respectively supporting said complementary mould halves on said frame and pivotal mounting means on said frame for at least one of said platens to permit movement thereof between a mould closed position wherein said platens are disposed in parallel relation, and a mould open position wherein said platens are disposed substantially 90° to each other;

an actuating member mounted on said frame for reciprocal linear movement; and

a compound lever system connected between said actuating member and said pivotally mounted platen to move said platen between mould open and mould closed positions in response to reciprocal movement of said actuating member, said compound lever system comprising:

(a) a two-armed main lever and an intermediate link, said link being pivotally connected at one of its ends to said main lever intermediate the ends of the latter, the other end of said link being pivotally connected to said frame whereby said main lever is supported on said frame to permit its articulation about one or more pivot points;



(b) a toggle lever connecting a first arm of said main lever to said actuating member;

(c) a guide pin secured to the upper face of said pivotally mounted platen, and trunnion means on said guide pin pivotally connecting and supporting said platen on the other arm of said main lever, and means for adjusting said trunnion means axially of said guide pin whereby to change the pivot point of said main lever along said pin;

(d) a guide lever pivotally mounted at one of its ends to said frame coaxially with the pivotal connection of said intermediate link to said frame, said guide lever at its opposite end having a bushing which receives said guide pin to permit limited axial movement of said pin relative to said guide lever;

(e) said toggle lever being disposed, when said reciprocal actuating means is at its limiting position corresponding to mould closed position, to lock said main and guide levers against pivotal movement.

4,072,459

NOZZLE FOR A GRANULATING DEVICE FOR GRANULATING SYNTHETIC PLASTICS MATERIAL

Friedrich Lambertus, Stuttgart, Germany, assignor to Werner & Pfleiderer, Stuttgart, Germany

Filed Apr. 12, 1976, Ser. No. 676,219

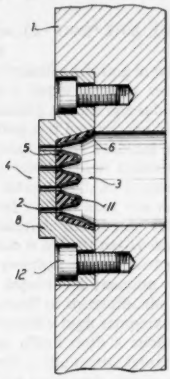
Claims priority, application Germany, Apr. 19, 1975, 2517402

Int. Cl.[2] B29F *3/04*

U.S. Cl. 425—464 **7 Claims**

1. In a device for granulating synthetic plastics material while in flowable consistency comprising a nozzle including a plate having a plurality of bores cylindrical along their length and a recess leading to said bores, said nozzle plate having an inlet side and an outlet side, the improvement comprising insulation material on the inlet side of the nozzle plate adjacent thereto and extending over at least several of said bores for reducing heat loss as the material to be granulated is passing through said bores, said insulation material comprising a plurality of protrusions extending from the inlet side of the nozzle plate in axial direction into said recess, said protrusions taper-

ing in narrowing fashion away from said inlet side and being rounded such that adjcent protrusions define therebetween a generally funnel-shaped extension of the respective nozzle bore thereby elongating the effective length of the bores, said nozzle having a space for receiving material to be fed to said



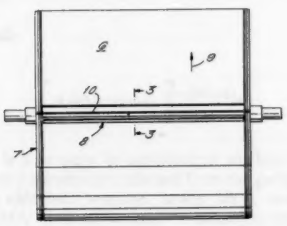
bores, said space opening into said recess and being common to said funnel-shaped extensions and in direct communication therewith such that the funnel-shaped extensions divide the flow of material to be granulated into several partial streams, and form-retaining coating means covering said insulation material at least on the areas defining said protrusions.

4,072,460

EMBOSSED PATTERNING OF ASBESTOS-CEMENT AND LIKE SHEETS

Warwick Henry Gazzard, St. Ives, and Roger Michael Kearin, Galston, both of Australia, assignors to James Hardie & Coy. Pty. Limited, Australia

Filed Nov. 6, 1975, Ser. No. 629,539
Claims priority, application Australia, Nov. 7, 1974, 9519/74
Int. Cl.[2] B29C *1/00*
U.S. Cl. 425—471 **2 Claims**



1. Apparatus for use in the production of sheets by successive laminations of a film of impressionable material with patterning in three-dimensional relief thereon, comprising:

(a) a rotatable size roll;

(b) a flexible mould layer having a surface patterned in three-dimensional relief circumferentially wrapped about said size roll with its patterned surface outward;

(c) circumferential lost motion connection means to secure the mould layer to the roll while permitting circumferential movement of the layer in relation to the roll and restraining radial movement therebetween comprising:

(1) a hinge for mounting the leading edge of the mould layer to the roll having one leaf attached to the mould layer and one leaf attached to the roll;

(2) an axially-directed keeper plate means mounted on said roll and engaging the trailing end of said mould layer to restrain said trailing end against radial movement but permit circumferential movement thereof;

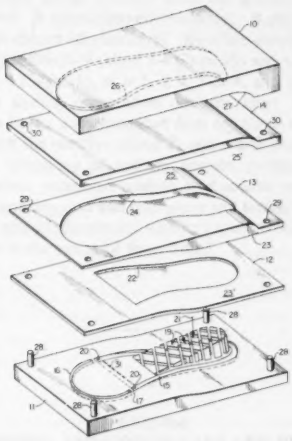
(3) a pair of circumferentially directed keeper plates means mounted on said roll and respectively engaging the side edge margins of said mould layer to restrain said margins against radial movement away from the roll but permitting circumferential movement thereof.

4,072,461

APPARATUS FOR THE PRODUCTION OF LAMINATED BODIES PARTICULARLY, MULTILAYERED SHOE SOLES

Harald Pirk, Breuberg, Germany, assignor to Metzeler Kautschuk AG, Munich, Germany

Division of Ser. No. 722,418, Sept. 13, 1976. This application Feb. 24, 1977, Ser. No. 771,736
Claims priority, application Germany, Sept. 11, 1975, 2540433
Int. Cl.[2] B29C *9/00, 11/00;* **B29H** *3/00*
U.S. Cl. 425—515 **7 Claims**



1. A vulcanization mold for producing a laminated article of at least three individual layers, the interfaces formed between the individual layers of the laminate being non-planer, wherein the mold comprises first and second outer mold plates, said first and second outer mold plates each having at least one mold cavity corresponding to the outer layers of the desired laminated article and each having a non-planar inner surface in which said at least one mold cavity is formed; a middle molding plate positioned between the first and second outer mold plates and movable in the direction of opening and closing of the mold and having an aperture corresponding to the middle layer of the desired laminate and having non-planar opposing surfaces corresponding to the inner surfaces of the first and second outer mold plates, respectively; and first and second intermediate plates, said first intermediate plate being removably positioned between the first outer mold plate and middle mold plate and said second intermediate plate being removably positioned between the second outer mold plate and the middle mold plate, each of said intermediate plates having a substantially uniform thickness and each having continuous non-planar surfaces, the surfaces of the first intermediate plate corresponding to the inner surface of the first outer mold plate and the surfaces of the second intermediate plate corresponding to the inner surface of the second outer mold plate; and wherein said molding plates and intermediate plates are arranged so as to be capable of forming a closed mold the mold cavities of which are aligned according to the alignment of the corresponding layers of the desired laminate.

4,072,462

TRANSFER PRINTING

Cyril Eric Vellins, and Leonard Fox Dixon, both of Huddersfield, England, assignors to L. B. Holliday & Company Limited, Huddersfield, England

Filed Nov. 8, 1974, Ser. No. 522,115

Claims priority, application United Kingdom, Nov. 12, 1973, 52493/73

Int. Cl.[2] D06P *5/06, 5/08, 5/10*

U.S. Cl. 8—2.5 A 16 Claims

1. A method of transfer printing in which printing is effected by transfer from a paper support web printed with an ink formulation containing at least one sublimable dyestuff suitable for transfer printing and having one or more amino, hydroxy or hydroxyalkylamino first reactant groups in the dyestuff molecule, or any combination thereof, onto a textile fabric composed of a natural and/or synthetic cellulosic material alone or in a blend with at least one natural and/or synthetic non-cellulosic material, the textile fabric having thereon a curable resin which is at least partly uncured and contains one or more hydroxymethyl, alkoxymethyl or aldehyde second reactant groups capable of reaction with the first reactant groups of the dyestuff or dyestuffs, the transfer printing being effected at a sufficiently high temperature and for a sufficient period of time to effect both a sublimation transfer of the sublimable dyestuff to the textile fabric and either a curing or an end-curing of the resin with simultaneous reaction between said first and second reactant groups to fix the dyestuff onto the cellulosic or part cellulosic textile fabric.

4,072,463

LIQUID PREPARATIONS OF REACTIVE DYESTUFFS

Ludwig Schlafer, Fischbach, Taunus, and Konrad Opitz, Liederbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Apr. 7, 1975, Ser. No. 565,737

Claims priority, application Germany, Apr. 9, 1974, 2417255

Int. Cl.[2] C09B *31/00;* D06P *1/38;* C09B *33/00*

U.S. Cl. 8—41 B 7 Claims

1. A liquid aqueous dyeing preparation of a reactive dyestuff which contains from 15 to 30% by weight of a dyestuff, which in the form of its free acid corresponds to the formula

$$\left[A-N=N-B-N=N-D\right]\begin{matrix}(SO_3H)_m\\(Z)_n\end{matrix}$$

or the formula

$$\left[A-N=N-D\right]\begin{matrix}(SO_3H)_m\\(Z)_n\end{matrix}$$

in which A is a benzene or naphthalene nucleus which may contain 1, 2 or 3 substituents selected from the group consisting of fluorine, chlorine, bromine, lower alkyl, lower alkoxy, trifluoromethyl, acetylamino, benzoylamino, chloroacetylamino, methylbenzoylamino, chlorobenzoylamino, carboxy, lower alkylsulfonyl, lower alkylsulfonylamino, phenylsulfonylamino, carbonamide, N-alkyl- and N-phenyl-substituted carbonamide, sulfonamide, N-alkyl- and N-phenyl-substituted sulfonamide,

B is a naphthalene nucleus which may be substituted by one or more groups selected from the group consisting of acetylamino, chloro-acetylamino, benzoylamino, carboxy, carbonamide, sulfonamide, lower alkyl-sulfonylamino, phenylsulfonylamino, lower alkylsulfonyl, phenylsulfonyl, hydroxy, amino, lower alkylamino and phenylamino in ortho position to one or to both azo groups,

D has the same meaning as B or is a pyrazol-4-yl-radical which is substituted in 3-position by a methyl, carboxy, carbonamide or carboxylic acid alkyl ester group having from 2 to 5 carbon atoms, and which carries in 5-position a hydroxy or an amino group, and which contains in 1-position a bound phenyl radical or naphthyl radical, which may be substituted by 1, 2 or 3 substituents selected from the group consisting of acetylamino, benzoylamino, lower alkyl, lower alkoxy, carboxy, carbonamide, sulfonamide, nitro, chlorine and bromine and in which the sulfo groups and the reactive radical(s) Z stand at the aromatic radicals of A, B or D, *m* is 2, 3, 4, 5 or 6, and *n* is 1 or 2, or of the copper, chromium or cobalt complex dyestuffs of a dyestuff which corresponds, in its metal-free form, to one of the above-mentioned formulas, in which A, B and C have the meanings specified above, and wherein the carbocyclic aromatic nuclei of the radicals A, B or D contain the radical of a hydroxy, amino or a carboxy group, to which the metal atom is linked, or of an anthraquinone or trisazo dyestuff or of a copper phthalocyanine dyestuff of the formula

$$(HO_3S)_m\text{-}F\text{-}Z_n,$$

wherein F is the dyestuff radical of an anthraquinone or a trisazo or a copper phthalocyanine dyestuff, and wherein Z is a fiber-reactive group selected from the group consisting of vinylsulfonyl, β-thiosulfato-ethylsulfonyl, β-phosphatoethylsulfonyl, β-chloro-ethylsulfonyl, β-sulfato-ethylsulfonyl, β-sulfato-ethylsulfonyl-N-(alkyl 1-4 C)-amido and vinylsulfonyl-N- (alkyl 1-4 C)-amido, *m* is 2, 3, 4, 5 or 6, and *n* is 1 or 2, and which dyeing preparation contains from 1 to 5% by weight of a buffer substance that does not show any chemical reaction with the reactive group Z, and which is selected from the group consisting of sodium acetate, potassium acetate, sodium oxalate, potassium oxalate, acid sodium and potassium salts of phosphoric acid and secondary and tertiary sodium and potassium salts of phosphoric acid and sodium borate, and has a pH value in the range of from 3 to 7.

4,072,464

EPOXYPROPYL AMMONIUM SALT AND BORIC ACID ASSISTED DYEING PROCESS

Jean Balland, Chateaurenault, France, assignor to Manufacture de Produits Chimiques Protex, Paris, France

Filed Mar. 1, 1976, Ser. No. 662,913

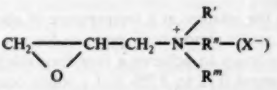
Claims priority, application France, Mar. 4, 1975, 75 07325

Int. Cl.[2] D06P *1/68*

U.S. Cl. 8—84 6 Claims

1. In a process for the treatment of textile material to improve the dyeing or printing thereof, the improvement which comprises the steps of:

a. applying to said textile material an epoxypropylammonium salt having the formula:



in which R′, R^n, R^M are lower alkyl radicals and X− is an anion selected from the group which consists of sulfate, sulfonate, phosphate and halogenide;

b. fixing the salt upon the textile material at least in part at an elevated temperature; and

c. treating the textile material prior to the application of said elevated temperature thereto with boric acid in an amount sufficient to avoid all yellowing of the fibers of said material and to prevent any detrimental action of urea at the elevated temperature.

4,072,465

DYEING POLYESTER FIBERS

Manfred Daeuble, Frankenthal, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Aug. 11, 1975, Ser. No. 603,443
Claims priority, application Germany, Sept. 14, 1974, 2444102
Int. Cl.[2] D06P 5/04
U.S. Cl. 8—169 10 Claims

1. In a process for dyeing polyester fibers with a disperse dye under pressure and at a temperature above 100° C. in an aqueous liquor containing anionic and nonionic surface active agents as an emulsifier, the improvement which comprises carrying out the dyeing such that 1000 parts by weight of said aqueous liquor contain as the leveling agent from 0.3 to 3 parts by weight of an aliphatic compound selected from the group consisting of esters, nitriles and ketones having from 7 to 16 carbon atoms.

4,072,466

CELLULOSIC TEXTILE TREATED WITH LOW FORMALDEHYDE FULLY ETHERIFIED METHYLOLATED MELAMINE WITH UREA-FORMALDEHYDE-GLYOXAL

David Trimble Hermann, Belle Mead, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 504,407, Sept. 9, 1974, Pat. No. 4,039,496. This application Mar. 25, 1977, Ser. No. 781,230
Int. Cl.[2] D06M 15/58
U.S. Cl. 8—183 6 Claims

1. A process for finishing cellulose-containing textile materials comprising

impregnating the materials with an aqueous solution containing an acid catalyst and a water-soluble textile finishing composition prepared by

reacting relative amounts of about 1.0 mole of melamine and from about 9.5 to 11.5 moles of formaldehyde at a pH of about 6.0 to 6.5 and a temperature of about 60° C. to 75° C., while concentrating under vacuum to form a reaction mixture of substantially fully methlolated melamine and formaldehyde,

recovering from about 30 to 35% by weight of the reaction mixture as distillate over a period of about 2 ½ to 3 hours,

etherifying the reaction mixture by reacting it in highly acidified alcohol at slighly elevated temperatures to obtain a mixture of substantially fully alkoxymethylated melamine resin and formaldehyde,

reacting the mixture of substantially fully alkoxymethylated melamine and formaldehyde with from about 1.65 to 3.3 moles of urea per mole of melamine and from about 0.1 to 0.5 mole of glyoxal per mole of urea at a pH of about 6.0 to 6.5 and a temperature of 60° to 75° C. under vacuum over a period of about 1 to 2 hours to recover an amount of distillate which ranges from about 15 to 20% based on the total weight of the reaction mixture,

reacting the mixture at a temperature of about 60° C. to 75° C. under atmospheric pressure for a period of about 2 to 3 hours to achieve a free formaldehyde content from about 0.75 to 3.5% and a solids content of from about 65% to 75% by weight of the mixture,

cooling the reaction mixture to ambient temperatures,

adding an acid-binding agent to make the mixture moderately alkaline, and

diluting the mixture with water to obtain suitable free formaldehyde and solids content,

drying the impregnated textile material, and

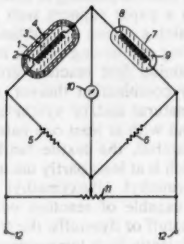
curing the dried textile material at a temperature from 325° to 350° F. for a period of 1 to 2 ½ minutes to obtain 2% to 10% of solids thereon based on the weight of the textile material.

4,072,467

COMBUSTIBLE GAS DETECTORS

Eric Jones, Chelmsford, England, assignor to English Electric Valve Co., Ltd., England

Filed Oct. 15, 1976, Ser. No. 732,861
Claims priority, application United Kingdom, June 18, 1976, 25464/76
Int. Cl.[2] G01N 27/16
U.S. Cl. 23—254 E 9 Claims



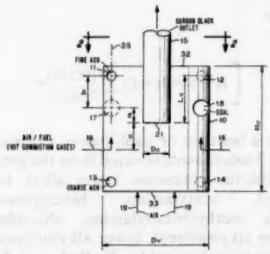
1. A gas detector of the kind in which a heatable wire filament exhibits a change in resistance occasioned by the change in its temperature which occurs due to the oxidisation of a combustible gas passing over it and wherein said heatable wire filament is embedded in a pellet consisting of a homogeneous mixture of an oxidisation catalyst material and a substantially non catalytic carrier material and a layer of oxidisation catalyst material is provided on the outside of said homogeneous pellet.

4,072,468

APPARATUS FOR THE PRODUCTION OF CARBON BLACK FROM COAL

Paul J. Cheng, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 583,317, June 2, 1975, Pat. No. 3,975,504, which is a continuation-in-part of Ser. No. 393,492, Aug. 31, 1973, abandoned. This application June 3, 1976, Ser. No. 692,623
Int. Cl.[2] C09C 1/50; B23C 5/18
U.S. Cl. 23—259.5 3 Claims



1. A carbon black reactor comprising:

a. a vertically positioned essentially cylindrically shaped chamber closed by an upper wall and a lower wall;

b. means for removal of smoke opening axially from said chamber through the upper wall and having a lower extremity extending downward into said chamber;

c. means for tangential introduction of coal through the periphery of said chamber above said lower extremity of said means for smoke removal said means for tangential introduction alligned to establish a mass of solids reactants helically flowing around the cylindrical chamber in one direction;

d. means for removing fine ash tangentially from said cham-

ber proximate to the upper wall of said chamber said means for removing fine ash alligned to receive said fine ash tangentially in the direction of flow of the mass flowing helically around the cylindrical chamber;

e. means for introducing oxidant extending radially through the periphery of said chamber and opening axially upwardly into said chamber at a locus beneath said lower extremity of said means for smoke removal;

f. means for the introduction of fuel gas radially through the periphery of the chamber and opening axially upwardly into said chamber, said means being located so that the fuel and the oxidant form a combustible mixture;

g. means for the tangential withdrawal of coarse ash through the periphery of said chamber proximate to the lower wall said means for removing coarse ash alligned to said coarse ash tangentiallly in the direction of flow of the mass flowing helically around the cylindrical chamber, and

h. means for the axial introduction of secondary oxidant into said chamber through said lower wall.

4,072,469

INTERCONNECTION ARRANGEMENT FOR A DUAL TEMPERATURE ISOTOPE EXCHANGE

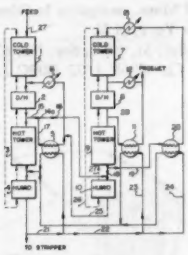
Gerard J. C. A. Pauluis, Brussels, Belgium, assignor to Atomic Energy of Canada Limited, Ottawa, Canada

Filed June 17, 1976, Ser. No. 697,221

Claims priority, application Canada, Sept. 9, 1975, 235094

Int. Cl.[2] B01D *59/33*

U.S. Cl. 23—260 **1 Claim**



1. An interconnection arrangement for two stages of a dual temperature isotope exchange apparatus for production of water enriched in deuterium comprising:

a. a first stage including a cold tower, a dehumidifier, a hot tower, a humidifier, piping means for passing hydrogen sulphide gas through the humidifier, hot tower, dehumidifier, cold tower and recycling to the bottom of the humidifier, a liquid inlet feed to the top of the cold tower, and piping means for passing the liquid from the bottom of the cold tower through the dehumidifier, the hot tower, and the humidifier to a first stage output,

b. a second stage including a cold tower, a dehumidifier, a hot tower, a humidifier, piping means for passing hydrogen sulphide gas through the humidifier, hot tower, dehumidifier, cold tower and recycling to the bottom of the humidifier, a liquid inlet feed to the top of the cold tower, and piping means for passing the liquid from the bottom of the cold tower through the dehumidifier to a second stage output,

c. a first heat exchanger,

d. a second heat exchanger,

e. a third heat exchanger,

f. means for taking a minor proportion of the liquid from the first stage output, passing generally equal fractions of this through the said first, second and third heat exchangers in parallel, recombining the fractions and returning to the piping means at a location between first stage hot tower and humidifier,

g. means for taking a minor proportion of the liquid from the piping between first stage dehumidifier and hot tower, passing a major proportion of this through the first heat exchanger and returning to the top of the second stage humidifier,

h. means for taking a minor proportion of the liquid from the piping between second stage dehumidifier and hot tower, passing this through the second heat exchanger, returning a major proportion to the top of the second stage dehumidifier, and passing the remainder to an output as product,

i. means for passing the liquid from the second stage output to the top of the first stage dehumidifier, and

j. means for taking a minor porportion of the liquid from the bottom of the second stage hot tower, passing through the said third heat exchanger and returning to the top of the second stage cold tower as liquid inlet feed.

4,072,470

GAS FEEDER FOR SULFONATION APPARATUS

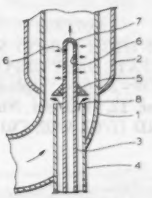
Keiichi Tsuto, Wakayama; Kanji Majima, Chiba, and Toshio Hirasaka, Yokohama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Mar. 23, 1977, Ser. No. 780,820

Claims priority, application Japan, Mar. 31, 1976, 51-39425[U]

Int. Cl.[2] C07C *143/02.16;* **B05B** *7/06;* **B01J** *4/00*

U.S. Cl. 23—284 **7 Claims**



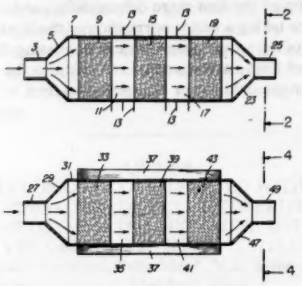
1. In a sulfonation apparatus in which a sulfonatable organic compound is flowed along the inner wall of a reaction tube in the form of a film and a gas containing SO_3 is flowed in the reaction tube in concurrent flow relationship with the organic compound for gas-liquid reactive contact therewith, the improvement which comprises: apparatus for feeding said gas comprising a pair of concentric gas-feeding tubes disposed concentrically in said reaction tube whereby a gas containing SO_3 can be flowed in the inner gas-feeding tube and an inert gas can be flowed in the annular clearance between the inner gas-feeding tube and the outer gas-feeding tube, the upper portion of the inner gas-feeding tube projecting above the upper end of the outer gas-feeding tube so that the upper end of the inner gas-feeding tube is disposed a preselected distance above the upper end of the outer gas-feeding tube, a baffle plate mounted on the upper projecting portion of the inner gas-feeding tube at a location close to, but spaced upwardly from, the upper end of the outer gas-feeding tube so that the inert gas is deflected outwardly to impinge against the inner wall of the reaction tube so that the sulfonatable organic compound does not become colored excessively by contact with SO_3-containing gas that flows through said inner gas-feeding tube.

4,072,471

CATALYTIC CONVERTER FOR REMOVING NOXIOUS COMPONENTS FROM A GASEOUS STREAM

Charles R. Morgan, Jr., Wenonah, and Paul W. Snyder, Jr., Pitman, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 28, 1974, Ser. No. 473,631
Int. Cl.[2] B01J 8/00; F01N 3/15
U.S. Cl. 23—288 FB 7 Claims



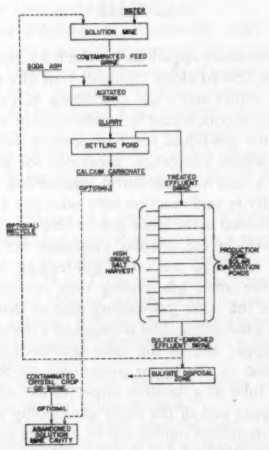
1. In a catalytic converter for use in a gaseous stream which comprises cylindrical segments of monolithic ceramic impregnated with one or more catalytically active materials, said segments of ceramic being contained in a cylindrical metal container having a gas inlet upstream from said segments and a gas outlet downstream therefrom and a plurality of spaced apart protruding metal fins attached to the outer circumference thereof, the improvement which comprises having said segments to monlithic ceramic axially spaced apart by about two inches within said metal container.

4,072,472

PRODUCTION OF HIGH PURITY SALT FROM HIGH SULFATE SALT DEPOSITS

Jerome A. Lukes, 1539 - 33rd St., Ogden, Utah 84403

Filed Dec. 12, 1973, Ser. No. 424,179
Int. Cl.[2] B01D 11/02, 9/02; C01D 3/06, 3/08
U.S. Cl. 23—297 7 Claims



1. A process comprising:

contacting a subterranean deposit containing NaCl contaminated with calcium and sulfate with an aqueous solvent to produce an aqueous brine containing dissolved calcium and sulfate values;

transferring said contaminated brine to a calcium treatment zone and contacting said brine with a reagent to insolubilize said calcium values, thereby producing a slurry with an aqueous phase substantially free from dissolved calcium values;

transferring said aqueous phase to the first of a plurality of solar evaporation ponds arranged in a production zone for series flow such that the brine is maintained at its saturated concentration with respect to NaCl throughout the zone and becomes progressively more concentrated with respect to sulfate in successive ponds, thereby producing an NaCl crystal crop in each of said ponds;

adjusting the flow rate of brine through said production zone to maintain the concentration of sulfate in the last of said ponds below its saturated concentration, thereby producing a sulfate-enriched effluent brine from said production zone;

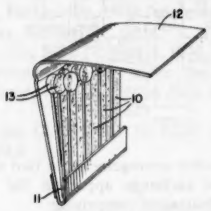
removing said sulfate-enriched effluent brine from said production zone; and harvesting the NaCl crystal crop from individual solar evaporation ponds of said production zone.

4,072,473

SELF-EXTINGUISHING MATCH AND METHOD OF MANUFACTURE

Stanley J. Radkowski, Wilbraham; John M. Lawrence, Monson; Enever Naggar, Longmeadow, and Raymond W. Dunham, Springfield, all of Mass., assignors to Diamond International Corporation, New York, N.Y.

Filed Mar. 31, 1976, Ser. No. 672,492
Int. Cl.[2] C06F 3/02; B05C 1/00
U.S. Cl. 44—46 24 Claims



1. A self-extinguishing match comprising

a match splint having opposite surfaces and opposite edges,

a layer of paraffin extending from one end of said splint along only a portion of said splint to a point between said one end and the opposite end of said splint,

an igniting head on said one end of said splint,

chemical fire retardant material on said opposite surfaces and opposite edges of said splint from said one end and extending toward said opposite end further along said splint than said layer of paraffin.

5. A method of manufacturing book matches of the self-extinguishing type comprising the steps of

preparing match splint combs,

mounting said combs on a conveying means with free ends of the match splints extending therefrom,

moving said combs on said conveying means and partially dipping said combs in hot melted paraffin, partially dipping said combs in igniting match head material,

dipping said combs to a point further up the combs beyond the farthest extent that paraffin will reach on the match splint combs in chemical fire retardant material in liquid form following any previous mentioned step after mounting said combs on a conveying means,

drying the material on said combs,

and assembling said combs into book match form.

4,072,474
MOTOR FUEL COMPOSITION

Robert R. Kuhn, Lansdale, and Warren H. Machleder, Bluebell, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 505,718, Sept. 13, 1974, abandoned, which is a continuation-in-part of Ser. No. 356,655, May 2, 1973, Pat. No. 3,846,089. This application June 30, 1975, Ser. No. 591,913

The portion of the term of this patent subsequent to Nov. 5, 1991, has been disclaimed.

Int. Cl.[2] C10L *1/22*

U.S. Cl. 44—58 **10 Claims**

1. A motor fuel composition consisting essentially of (a) a major amount of a hydrocarbon fuel for internal combustion engines, and (b) a minor detergent amount of a mixed polyester of a polycarboxylic acid residue and a mixed ester group residue of a C_1–C_{24} alcohol and a C_4–C_9 alkyl phenoxy polyethoxy ethanol containing 1–20 moles of ethylene oxide.

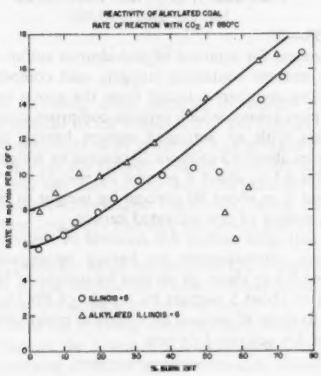
4,072,475
METHOD FOR IMPROVING GASIFICATION PROCESS RATES AND YIELDS BY MEANS OF ELECTROPHILIC AROMATIC SUBSTITUTION PRETREATMENT OF COAL

Richard H. Schlosberg, New Providence; Franklin J. Wright, Plainfield, and Ronald L. Hartgerink, Edison, all of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Sept. 3, 1976, Ser. No. 720,144

Int. Cl.[2] C10J *3/00*

U.S. Cl. 48—210 **26 Claims**



1. A process for the gasification of coal which comprises:
(1) treating the coal with a reagent selected from the group consisting of alkylating agents and acylating agents and thereby introducing into the coal a radical selected from the group consisting of aliphatic hydrocarbon radicals and acyl radicals respectively to yield a treated coal;
(2) subjecting the treated coal to gasification conditions.

4,072,476
AUTOMATIC LOADER

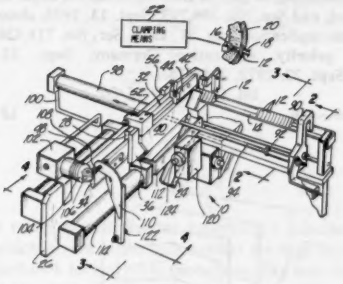
Walter A. Kulson, Plymouth, Mich., assignor to Wit-Son Carbide Tool, Inc., Plymouth, Mich.

Filed Sept. 11, 1975, Ser. No. 612,291

Int. Cl.[2] B24B *19/08*

U.S. Cl. 51—215 H **13 Claims**

1. Apparatus for transferring workpieces from a magazine stack to a clamping spindle comprising: a slide body mounted for reciprocal displacement between a pick-up position and a release position; part holder means on the slide body and defining a seat for receiving the workpieces laterally thereof and releasing the workpieces axially and incrementally urging the workpieces into the seat when the body is in the pick-up position; and means for adjusting the position of the part holder means with respect to the slide body to relocate the relative position of the seat thereon for precisely receiving the workpieces therein, said part holder means comprising a plate having a surface for facial abutment against a surface of the slide body, a cam aperture formed in the plate, a cam hole in the body and aligned with the cam aperture when the plate is on the body, and a cam screw extending into the hole through and in contact with the aperture for displacing the plate relative to the body upon rotation thereof.



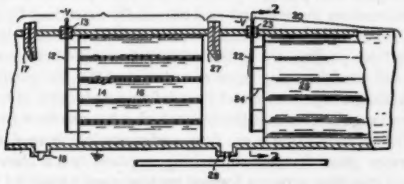
4,072,477
ELECTROSTATIC PRECIPITATION PROCESS

Donald N. Hanson, Orinda, and Charles R. Wilke, El Cerrito, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Continuation of Ser. No. 252,406, May 11, 1972, abandoned, which is a continuation-in-part of Ser. No. 700,436, Jan. 25, 1968, abandoned, which is a continuation-in-part of Ser. No. 518,405, Jan. 3, 1966, abandoned. This application Mar. 21, 1975, Ser. No. 560,980

Int. Cl.[2] B03C *3/01*

U.S. Cl. 55—10 **2 Claims**



1. An electrostatic precipitation process for continuously removing foreign particles from a gas stream and depositing said particles on conductive surface means coupled to ground and at least partially bounding said gas stream including the steps of introducing into said gas stream in the vicinity of said surface means a predetermined number of additional particles and electrostatically charging both said foreign particles and said additional particles with a charge of the same predetermined polarity, such predetermined number of additional particles being selected that together with said foreign particles there is provided adjacent said surface means a space charge region of sufficient intensity where substantially all of said foreign particles and said additional particles move towards said surface means and are deposited thereon under the influence of the electric field formed by said space charge region.

4,072,478

MIST REMOVER

Ulrich Regehr, 65, Susterfeld, Aachen, Germany (D-51), and Siegfried Bulang, 177 Drievogelstraat, Kerkrade-West, Netherlands

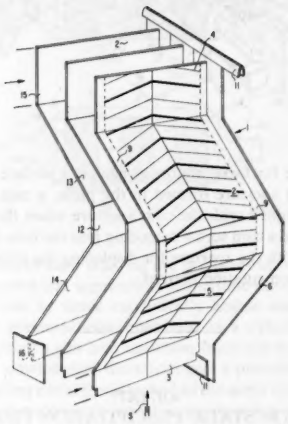
Continuation of Ser. No. 565,726, March 31, 1975, abandoned, and a continuation-in-part of Ser. No. 396,796, Sept. 13, 1973, abandoned, and Ser. No. 396,793, Sept. 13, 1973, abandoned.

This application Aug. 11, 1976, Ser. No. 713,426

Claims priority, application Germany, Sept. 22, 1972, 2246474; Sept. 22, 1972, 2246475

Int. Cl.[2] B01D *45/00*

U.S. Cl. 55—440 12 Claims



1. An apparatus for removing mist from a gas flow comprising a plurality of partitioning walls arranged in parallel relation to one another and a plurality of separator plates arranged in parallel relation to one another and at right angles to the partitioning walls, the partitioning walls further comprising means for maintaining the relation between the separator plates and the partitioning walls, the separator plates having a v-shaped cross-section comprising a floor portion, two inclined, oppositely-sloped wall portions joined to the floor portion at opposite extremities thereof, and two outwardly-extending lip portions fixed to the wall portions in substantially parallel relation to the floor portion, the projected included angle between the two wall portions being equal to or less than 90°, the partitioning walls and separator plates thus defining a plurality of tortuous rectangular channels through which a gas can flow from a gas flow inlet portion a gas flow outlet portion thereof, each separator plate further comprising a plurality of chevron-shaped directing grooves formed by V-shaped sinusoidal corrugations arranged uniformly adjacent to each other such that a continuous pattern of directing grooves exists from the end of the gas flow inlet portion through the gas flow outlet portion, the chevron-shaped directing grooves pointing from the gas flow inlet portion to the gas flow outlet portion and having a chevron angle of between 125° and 135°, said directing grooves being centrally disposed between each pair of partitioning walls and terminating short of the opposite edges of said plates such that run off zones free of grooves exist between the chevron-shaped directing grooves and each partitioning wall, the partitioning walls projecting above and below the separating plates and joined together by means for varying the spacing between the separator plates, the gas flow inlet portion of the separator plates having a lengthwise dimension substantially shorter than that of the gas flow outlet portion and being void of said directing grooves.

4,072,479

IMPREGNATED ACTIVATED CARBON FOR IMPROVED REMOVAL OF MALODOROUS COMPOUNDS

Rabindra Kumar Sinha, Oakdale; Norman J. Wagner, and Ronald S. Joyce, both of Pittsburgh, all of Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 662,783, March 1, 1976, abandoned, which is a continuation-in-part of Ser. No. 570,542, April 22, 1975, abandoned. This application Dec. 20, 1976, Ser. No. 752,498

Int. Cl.[2] B01D *53/04*

U.S. Cl. 55—73 5 Claims

1. A process for removal of H_2S and methyl mercaptan from gas streams containing oxygen, comprising contacting said gas stream with an activated carbon having impregnated therein from about 0.5 to about 20 percent by weight of NaOH, and from about 4 to about 50 percent by weight of moisture, both based on weight of dry activated carbon.

4. An activated carbon for removal of H_2S and methyl mercaptan, characterized by having impregnated therein from about 0.5 to about 20 percent by weight of NaOH, and from about 4 to about 50 percent by weight of moisture, both based on weight of dry activated carbon.

4,072,480

DUAL IMPREGNATED ACTIVATED CARBON FOR IMPROVED REMOVAL OF MALODOROUS SULFUR COMPOUNDS

Norman J. Wagner, Pittsburgh, Pa., assignor to Calgon Corporation, Pittsburgh, Pa.

Filed Jan. 7, 1977, Ser. No. 757,729

Int. Cl.[2] B01D *53/04*

U.S. Cl. 55—73 7 Claims

1. A process for removal of malodorous sulfur compounds from gas streams containing oxygen, said compounds being one or more members selected from the group consisting of H_2S and mercaptans, which process comprises contacting said gas stream with an activated carbon having impregnated therein from about 0.5 to about 20 percent by weight of NaOH, from about 0.1 to about 5 percent by weight of PbOAc, and from about 4 to about 50 percent by weight of moisture, all based on weight of dry activated carbon.

6. An activated carbon for removal of malodorous sulfur compounds, characterized by having impregnated therein from about 0.5 to about 20 percent by weight of NaOH, from about 0.1 to about 5 percent by weight of PbOAc, and from about 10 to about 40 percent by weight of moisture all based on weight of dry activated carbon.

4,072,481

DEVICE FOR SEPARATING MULTIPLE PHASE FLUID SYSTEMS ACCORDING TO THE RELATIVE SPECIFIC GRAVITIES OF THE PHASE

Claude C. Laval, Jr., 2444 N. Farris Ave., Fresno, Calif. 93705

Continuation of Ser. No. 675,298, April 9, 1976, abandoned. This application Feb. 24, 1977, Ser. No. 771,687

Int. Cl.[2] B01D *19/00*; B04C *5/103*

U.S. Cl. 55—177 6 Claims

1. In combination with a pump for liquids having an intake disposed in a well containing a three phase fluid system including a gaseous phase, a liquid phase and a particulate solid phase, a device for protecting the liquid pump from the passage of the gaseous phase and the particulate solid phase therethrough comprising:

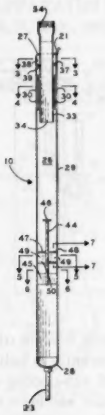
A. a vortexing chamber immersed in the fluid system in the well having upper and lower end walls and a sidewall defining a surface of revolution concentric to an axis disposed longitudinally of the well;

B. a substantially cylindrical vortex finder connected to the intake of said pump mounted in the upper end wall of the chamber and extended concentrically axially downwardly

in the chamber having an open lower end intermediate the upper and lower end walls of the chamber;

C. a partition circumscribing the vortex finder mounted on the sidewall in downwardly spaced relation to the upper end wall of the chamber to define a compartment for collecting gas thereabove in the chamber, said partition having a gas passage therethrough adjacent to the vortex finder to admit gas to the compartment and being substantially impervious outwardly thereof;

D. means in the sidewall for directing the fluid system of the well into the vortexing chamber tangentially to a circle concentric to the axis thereof at an elevation below the passage in response to operation of the pump whereby the fluid swirls downwardly in the chamber in a centrifuging



action throwing solid particles outwardly for gravitational descent to the lower end of the chamber, the gaseous components swirl inwardly and upwardly for movement through the passage into the gas collecting compartment, and said fluid having had solid particles and gaseous components centrifuged therefrom swirls downwardly and then upwardly through the lower end of the vortex finder;

E. a gas pump for drawing gas from the compartment having an intake connected to the compartment and a discharge at the surface of the well; and

F. a tail pipe for drawing solid particles from the chamber mounted on the lower end wall in communication with the vortexing chamber and downwardly extended therefrom.

4,072,482

CONTINUOUS DEODORIZING APPARATUS OF FAT AND OIL

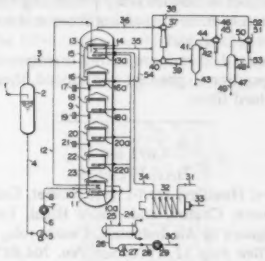
Makoto Aoki, Machida, and Tadao Nishiyama, Yokohama, both of Japan, assignors to The Nisshin Oil Mills, Ltd. and JGC Corporation, both of Tokyo, Japan

Filed June 21, 1976, Ser. No. 698,124
Int. Cl.[2] B01D *19/00*
U.S. Cl. 55—195 **5 Claims**

1. An apparatus for continuously deodorizing fat and oil, comprising:

a. a deodorizing tower having an inlet means for supplying a feedstock fat or oil containing an odor-emitting substance, an outlet means for delivering the deodorized fat or oil, the tower housing a heating tray uppermost, a charge control tray beneath the heating tray, a heat exchange tray at the bottom, a discharge control tray just above the heat exchange tray, and at least one deodorizing tray disposed between the charge control tray and the discharge control tray;

b. a steam ejector for withdrawing the odoremitting substances from the top of the tower; and



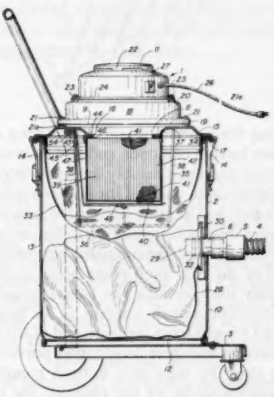
c. a steam superheater for generating a superheated steam which is used as the heat transfer medium for heating the feedstock fat and oil in the heating tray and, then, utilized as the operating stream of the steam ejector.

4,072,483

VACUUM CLEANERS

Dewey I. Doyle, Jr., Grand Rapids, Mich., assignor to Doyle Vacuum Cleaner Company, Grand Rapids, Mich.

Filed May 20, 1976, Ser. No. 688,111
Int. Cl.[2] B01D *46/02*
U.S. Cl. 55—372 **4 Claims**



1. A vacuum cleaner comprising

a. a casing comprising

(1) a tank having

(a) a closed bottom; and

(b) an open top, and

(2) a cover member

(a) mounted on said open top, and

(b) movable between open and closed position relative thereto,

b. said tank having inlet means for feeding air thereinto,

c. said cover having outlet means for feeding air outwardly therethrough,

d. a combination motor-blower unit mounted in said cover for drawing air inwardly through said inlet means and discharge air outwardly through said outlet means when said cover is disposed in said closed position on said tank,

e. a filter bag removably mounted in said tank and operatively connected to said inlet means for filtering air passing from said inlet means to said outlet means,

f. a second filter removably mounted on said open top and

extending thereacross in position to filter air passing from said filter bag to said outlet means,

g. a third filter releasably secured to and supported by said cover member in downwardly projecting relation thereto in a position to filter air passing from said second filter to said outlet means, and

h. means secured to and projecting downwardly from said cover in position to prevent said second filter from engaging said third filter.

4,072,484

BAG FILTER

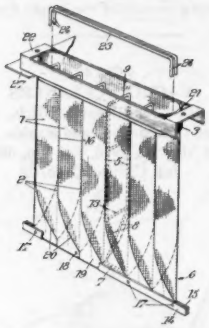
Christian Carre, Houilles; Jean-Pierre Guibet, Gamilly-Vernon; Albert Rebours, Chatou, and Andre Rigal, Le Pecq, all of France, assignors to Air Industrie, Courbevoie, France

Filed July 12, 1976, Ser. No. 704,647

Claims priority, application France, July 25, 1975, 75 23301

Int. Cl.[2] B01D *46/02*

U.S. Cl. 55—379 **13 Claims**



1. A filter bag for a filter system, comprising a number of parallel channels having one open end and embodied by interconnecting, along parallel assembly lines distributed over bag length, two opposite side walls of the bag, the side walls meeting at the open end; and a frame introduced into each channel, the frame having two substantially parallel members which extend in a plane at least substantially perpendicular to the main direction of the bag, such plane being equidistant from the two assembly lines forming the lateral boundaries of the particular channel concerned, wherein, at the bottom bag end near the bag end remote from the open end of the bag, the two substantially parallel members have lower portions which are configured to meet by way of a bottom member which is substantially perpendicular to the plane of the two substantially parallel members — that is which extends substantially in the main direction of the bag, such that the frame as viewed perpendicularly to said plane tapers over its lower portion from a width determined by said parallel members to a substantially lesser width determined by said bottom member.

4,072,485

METHOD OF AND ARRANGEMENT FOR PROCESSING THROUGH LOW TEMPERATURE HEAT EXCHANGES AND IN PARTICULAR FOR TREATING NATURAL GASES AND CRACKED GASES

Charles Becdelievre, Maurepas; Victor Kaiser, Maisons Laffitte, and Henri Paradowski, Rueil-Malmaison, all of France, assignors to Compagnie Francaise d'Etudes et de Construction - Technip, Rueil-Malmaison, France

Filed Oct. 4, 1976, Ser. No. 729,182

Claims priority, application France, Jan. 30, 1976, 76 02625

Int. Cl.[2] F25J *3/06*

U.S. Cl. 62—23 **16 Claims**

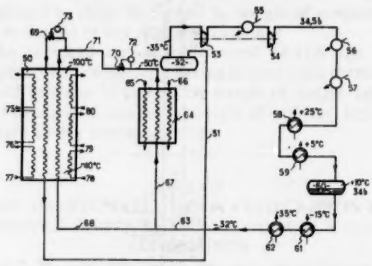
1. In a method for refrigerating a natural gas or a cracked gas by indirect heat exchange with a cycle gas mixture at temperatures ranging from −40° C. to −140° C., the improvement comprising the sequence of steps

compressing a cycle gas mixture consisting essentially of C_1, C_2 and C_3 hydrocarbons,

cooling said compressed cycle gas mixture in a plurality of successive staged external, indirect heat exchanges with coolants selected from the group consisting of water, air, propane and propylene to about 40° C., whereby said cycle mixture is fully condensed,

dividing the fully condensed cycle mixture into at least an auxiliary stream and a remaining stream,

passing said auxiliary stream through an auxiliary heat exchanger countercurrently in indirect heat exchange with a colder stream employed in refrigerating the natural gas, whereby said auxiliary stream is sub-cooled,



passing said remaining stream through a main heat exchanger countercurrently in indirect heat exchange with a combined liquefied sub-cooled cycle mixture as defined below after the latter has been expanded and passed into said main heat exchanger, whereby said remaining stream is sub-cooled,

combining said sub-cooled auxiliary and remaining streams to form said combined liquefied sub-cooled cycle mixture,

expanding said combined sub-cooled stream and passing it at a temperature of from about −100° C. to about −140° C. countercurrently into said main heat exchanger in indirect heat exchange with said remaining stream and with a warmer stream employed in refrigerating the natural gas.

4,072,486

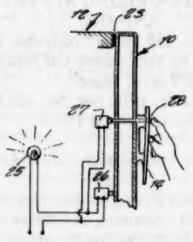
SEE-THROUGH, SMOKED GRAY, PLEXIGLASS REFRIGERATOR DOOR

Ruth Joseph, 153 Brabant St., Apt. 5C, Staten Island, N.Y. 10303

Filed Nov. 3, 1976, Ser. No. 738,294

Int. Cl.[2] F25D *23/02*

U.S. Cl. 62—131 **1 Claim**



1. A household refrigerator including a case having a cooler compartment and a freezer compartment cooled by a refrigerating mechanism, and a front door of said refrigerator being made from a transparent Plexiglass material that is tinted smoke gray so that visibility therethrough is not readily clear

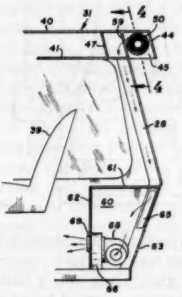
from an outside when an interior of said refrigerator is not illuminated; said door including a sealed, central, air space insulation between inner and outer wall thereof; said door being mounted upon hinges and including a pull handle, a magnet-impregnated gasket mounted on an inner side of said door for abuttment with a metal front face of said refrigerator case; a lamp inside said case being in a circuit with a first switch automatically operated when said door is opened and is also in a circuit with a second switch manually operated by a pushbutton on an outer side of said door, said lamp providing illumination means inside said refrigerator so to allow clear visibility readily through said transparent, smoke gray Plexiglass door.

4,072,487

AIR CONDITIONING APPARATUS FOR TRACTOR CAB

Gordon A. Irwin, Harwood, N. Dak., assignor to Steiger Tractor Inc., Fargo, N. Dak.

Filed Dec. 10, 1976, Ser. No. 749,361
Int. Cl.² B60H *3/04*
U.S. Cl. 62—244 **9 Claims**



1. In combination, a tractor having an operator's cab comprising a plurality of side walls and a roof, said side walls including a rear wall, and said roof having a portion projecting rearwardly beyond said rear wall,

an air conditioner for said cab including an air inlet, a filter, heat exchange means for changing the heat content of the air passing therethrough, an air outlet opening into said cab and air circulating means for causing air to enter said inlet and pass through said filter, said heat exchange means and out through said air outlet into said cab,

said rearwardly projecting portion of said roof having a compartment therein for said filter and a downwardly disposed air inlet disposed to the rear of said rear wall,

and means for mounting said filter in said compartment above said air inlet so that foreign matter accumulating on the exterior of said filter is free to fall off of said filter and out through said air inlet.

4,072,488

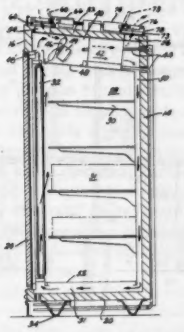
AIR DEFROST REACH-IN REFRIGERATED DISPLAY CABINET

William C. Johnston, Atlanta, Ga., assignor to Kysor Industrial Corporation, Cadillac, Mich.

Filed Dec. 10, 1976, Ser. No. 749,346
Int. Cl.² F25D *21/10*
U.S. Cl. 62—282 **5 Claims**

1. A reach-in refrigerated display case comprising:

a cabinet defining a product storage and display space therein and a coil chamber; access doors on one side of said cabinet to said storage and display space; refrigeration coil means in said chamber; recirculatory passage means between said space and said coil means including cold air flue means from said coil means to said space and return air flue means from said space back to said coil, at least one of said flue means being restricted to flow; air propelling means in said chamber for propelling air from said return flue means, to said coil means, then to said cold air flue means for passage about said product zone during normal operation; defrost inlet and outlet ports to and from said chamber and astraddle of said coil means and propelling means, the flow resistance through said ports being insignificant compared to that through said flues and display space, for flow of defrosting ambient air through said inlet



ports, said coil means, and said outlet ports under the influence of said propelling means to cause a short circuit flow of ambient air through said coil without significant flow through said product space when said ports are open, thereby creating aerodynamic isolation of the coil means from the display during defrost; doors on said inlet and outlet ports to open and close said ports; and door opening and closing means for said doors.

4,072,489

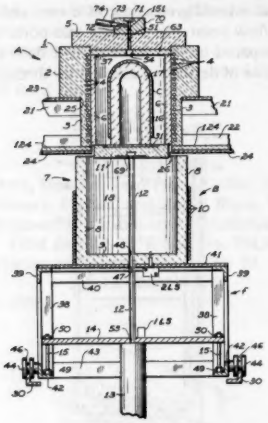
VACUUM PROCESS FOR AVOIDING DEVITRIFICATION DAMAGE TO TRANSPARENT SLIP-CAST SILICA CRUCIBLES

Ted A. Loxley; Walter G. Barber; Walter W. Combs, all of Mentor, and John M. Webb, Chargin Falls, all of Ohio, assignors to Sherwood Refractories, Inc., Cleveland, Ohio

Continuation-in-part of Ser. No. 495,129, Aug. 5, 1974, Pat. No. 3,972,704, which is a continuation-in-part of Ser. No. 363,622, May 24, 1973, Pat. No. 3,837,825. This application May 10, 1976, Ser. No. 684,730
The portion of the term of this patent subsequent to Sept. 24, 1991, has been disclaimed.
Int. Cl.² C03B *23/20, 32/00*
U.S. Cl. 65—18 **7 Claims**

7. A process for manufacturing thin-wall water-free crucibles for use in the growing of silicon crystal rods comprising the steps of slip casting a porous vitreous silica crucible of a predetermined shape from a slurry of finely divided silica particles of high purity having an average particle size not in excess of 10 microns, the silica of said crucible containing chemically bound water in the form of hydroxyl groups, drying the crucible to remove the free water and firing it to burn out the combustibles and to strengthen the crucible while providing a rigid body of high purity, placing the crucible on a refractory support, heating the crucible on said support in a furnace from a temperature below 2200° F. to a sintering temperature up to about 3150° F. in a vacuum or helium atmosphere for a period of at least several minutes to coalesce the particles and to provide a high-density transparent vitreous silica, and cooling the resulting transparent silica crucible, the chemically combined water being removed from the fired crucible before it is sintered to high density by firing it at a temperature up to 2200° F. for a substantial time period and

under a high vacuum such that the transparent vitreous silica of the finished sintered crucible has a hydroxyl content so low



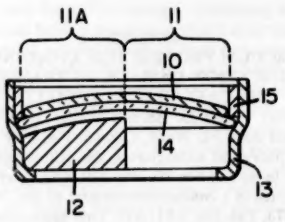
that it is not subject to devitrification damage during growing of the silicon crystal.

4,072,490

APPARATUS AND PROCESS FOR PRODUCING A GRADIENT PHOTOCHROMIC OPHTHALMIC LENS

Edwin J. Illig, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Nov. 8, 1976, Ser. No. 739,604
Int. Cl.[2] C03B *32/00*
U.S. Cl. 65—30 R **4 Claims**



1. A process for manufacturing a gradient photochromic ophthalmic lens blank which comprises the steps of:

(a) subjecting an ophthalmic lens blank composed of a potentially photochromic glass to a heat treatment at a temperature sufficient to develop photochromic properties in said glass, while

(b) maintaining a selected portion of the ophthalmic lens blank in proximity to a solid metal heat sink having a heat capacity of at least about 15 calories $^{\circ}$ C^{-1};

said metal heat sink acting to provide a temperature gradient across the ophthalmic lens blank which is effective to provide a gradient in photochromic properties thereacross.

4. Lens treating apparatus for producing a gradient photochromic ophthalmic lens blank which comprises:

(a) a cylindrical open-bottomed step-ring former cup, said former cup having a circular wall which includes a circumferential step therein;

(b) a ceramic former positioned within the step-ring former cup and edge-supported by the circumferential step, said ceramic former being suitable for supporting a potentially photochromic ophthalmic lens blank;

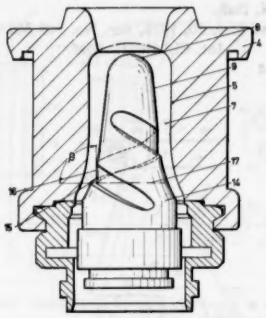
(c) a cast iron heat sink of semicircular cross-section positioned against the circular wall of the former cup and immediately beneath the ceramic former, said cast iron heat sink having a heat capacity of at least 15 calories $^{\circ}$ C^{-1}.

4,072,491

METHOD FOR PRODUCING BLOWN HOLLOW GLASS OBJECTS

Heinz Kramer, Oldenburg; Norbert Peretti, Mulheim (Ruhr), and Helmut Waschneck, Dusseldorf, all of Germany, assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 585,655, June 10, 1975, Pat. No. 4,008,063. This application Sept. 23, 1976, Ser. No. 725,735
Claims priority, application Germany, June 26, 1974, 2430656
Int. Cl.[2] C03B *9/14*
U.S. Cl. 65—72 **3 Claims**



1. A method for the production of blown hollow glass bodies having an optical inner wall structure comprising the steps of introducing a heated glass blank into a hollow mold cavity, providing a plunger having a central longitudinal axis and an exterior surface generally formed in a configuration tapering toward a narrower leading end of said plunger, said plunger being adapted to be inserted into said mold cavity with said leading end first and to be pressed against said glass blank to form said hollow glass body, forming on the exterior surface of said plunger a helically shaped molding pattern adapted to shape the inner wall structure of said glass body when said plunger is pressed against said glass blank, said helical molding pattern comprising a main pattern surface configured to extend throughout said helical molding pattern at an angle of not less than **90°** relative to the diameter of said plunger, said angle being taken as an exterior angle relative to the body of said plunger when the diameter from which said angle is taken is located rearwardly of said main pattern surface relative to said leading end of said plunger, said angle being taken as an interior angle relative to the body of said plunger when the diameter from which said angle is taken is located forwardly of said main pattern surface relative to said leading end of said plunger, inserting said plunger into said mold cavity and pressing said plunger against said glass blank to form said hollow glass body with an optical inner wall configured with a pattern coinciding with the molding pattern on the exterior surface of said plunger, and withdrawing said plunger axially from said mold after pressing said plunger against said glass blank.

4,072,492

GLASS BENDING LEHR WITH PRE-HEAT HOOD

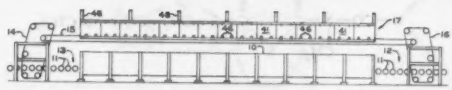
William A. Castine, Jr., Jeannette, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 26, 1976, Ser. No. 745,326
Int. Cl.[2] C03B *23/02*
U.S. Cl. 65—107 **10 Claims**

1. A method of shaping glass sheets including the steps of supporting a glass sheet on support means comprised of a material having a greater heat capacity than glass, conveying said support means and said glass sheet into a horizontally

elongated heating chamber wherein the entire glass sheet is heated to a temperature sufficient to soften the glass sheet as it passes from an entrance end of the heating chamber to a longitudinally spaced exit end of the heating chamber, shaping the glass sheet while in the softened condition, removing the glass sheet from said support means, and conveying said support means back to the entrance end of the heating chamber so as to support a subsequent sheet of glass through the heating and shaping steps, wherein the improvement comprises:

trapping waste heat escaping from the heating chamber in a partially closed hood structure having a top, sides, and an open bottom spaced from and overlying at least a portion of said heating chamber so that the air within said hood becomes heated above ambient temperatures, and passing said support means through the heated air within said



hood during the step of conveying the support means back to the entrance end of the heating chamber.

4. An apparatus for shaping glass sheets comprising a horizontally elongated heating chamber having longitudinally spaced inlet and outlet openings and means to heat sheets of glass therein to an overall softened condition, support means for supporting a sheet of glass as it passes through said heating chamber, conveyor means for passing said support means through the heating chamber from the inlet opening to the outlet opening, second conveyor means overlying the heating chamber for returning said support means to the inlet end of the heating chamber, and hood means spaced from the top of said heating chamber and having a top, sides, and an open bottom partially enclosing said second conveyor means and oriented to entrap hot air rising from the heating chamber.

4,072,493

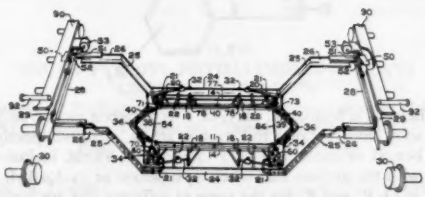
METHOD AND APPARATUS FOR RESHAPING GLASS SHEETS

Vaughn R. Imler, Valencia, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 720,866, Sept. 7, 1976, abandoned. This application Jan. 27, 1977, Ser. No. 763,259

Int. Cl.[2] **C03B** *23/02*

U.S. Cl. 65—107 **21 Claims**



1. Apparatus for shaping a glass sheet to a shape that includes a sharp bend extending across a dimension of said sheet by the gravity sag method comprising a plurality of rigid, metal shaping rails disposed in end-to-end relation to define an outline shaping mold having an upper shaping surface conforming to the shape desired slightly inward of the margin of a glass to be shaped thereon, each of said shaping rails having an upper edge surface providing a different portion of said upper shaping surface and including an end shaping rail having inner ends defining an end section of said mold and a pair of longitudinally extending, transversely spaced shaping rails defining a main section of said mold, means supporting said end shaping rail for pivoting relative to said main mold section between an open mold position wherein the inner ends of said end shaping rail are separated from a pair of transversely spaced ends of said elongated shaping rails and a closed mold position where said inner ends of said end shaping rail are closely spaced from said pair of ends of said elongated shaping rails, the ends of said elongated shaping rails providing supports for a flat glass sheet intermediate its ends when said sheet is mounted on said mold for bending and providing supports for the glass sheet after the latter is bent adjacent the inner ends of said end shaping rail, an elongated, electroconductive ribbon extending across the space between said elongated shaping rails entirely below said upper shaping surface along a line in close adjacency to the pair of flat glass supporting ends of said elongated shaping rails, guiding means located laterally outside each of said elongated shaping rails and having a surface engaging said ribbon to control the vertical position of said flexible electroconductive ribbon to one below said shaping surface, a pair of electrodes comprising an electrode laterally outside each of said guiding means for electrical connection with the ends of said ribbon and means carried in electrically insulating relation to said mold and its support adapted to couple said pair of electrodes to a source of electrical energy, said apparatus being clear of any structural element above the area enclosed by said rigid metal shaping rails to facilitate loading and unloading of a glass sheet relative to said mold.

14. A method of bending a glass sheet to a sharp bend by the gravity sag technique on an outline sectionalized mold comprising supporting a flat glass sheet intermediate its end on a pair of transversely spaced ends of elongated shaping rails forming a main section of said mold and at one longitudinal end portion thereof on the longitudinally outer portion of an end shaping rail pivotally movable between a spread mold position where its inner ends are spaced from the ends of said main section shaping rails and a closed mold position wherein said ends of said shaping rails are adjacent to one another so that a main portion of said glass sheet is superimposed over said main section of the mold and an end portion of said glass sheet is superimposed over said end shaping rail of the mold, supporting an electroconductive ribbon below and in approximate alignment with a line of support provided by said pair of ends of said main section shaping rails, heating the glass sheet in an enclosed hot atmosphere to an elevated temperature, applying electric current to said electroconductive ribbon whereby the latter radiates heat upward toward the bottom surface of said supported glass sheet, pivoting said end shaping rail upward to fold the end portion of said glass sheet supported thereon relative to the main portion of said glass sheet along a line aligned with the length of said ribbon.

4,072,494

METHOD AND DEVICE FOR THE WET COMPOSTING OF ORGANIC SLUDGE

Hans Gujer, Glattalstrasse 149, 8153 Rumlang, Switzerland

Continuation of Ser. No. 388,251, Aug. 14, 1973, abandoned. This application Aug. 7, 1975, Ser. No. 602,796

Claims priority, application Switzerland, Aug. 25, 1972, 12644/72

Int. Cl.[2] **C05F** *11/08*

U.S. Cl. 71—9 **14 Claims**

1. A method for wet composting organic sludge comprising feeding the sludge to be treated into a continuous flow system including a gas-tight mixing container together with an oxygen-containing gas for promoting a composting reaction in the

sludge, maintaining a static pressure in the mixing container within a range above 1 atmosphere and up to 6 atmospheres, said static pressure being developed by the composted sludge after flowing through said container, and simultaneously maintaining the temperature within the flow system within a range above 55° C. and less than 75° C.

4,072,495

5-BENZOFURANYL ESTERS AS HERBICIDES AND PLANT GROWTH REGULANTS

Peter Stuart Gates, Cambridge; John Gillon, Great Shelford, and David Thomas Saggers, Saffron Walden, all of England, assignors to Fisons Limited, London, England

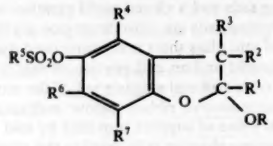
Continuation-in-part of Ser. No. 275,256, July 26, 1972, abandoned, which is a division of Ser. No. 826,274, May 20, 1969, Pat. No. 3,689,507. This application Jan. 12, 1976, Ser. No. 648,161

Claims priority, application United Kingdom, May 24, 1968, 24858/68; Feb. 8, 1969, 6951/69; Apr. 8, 1969, 17985/69

Int. Cl.² A01N *9/28*

U.S. Cl. 71—76 **37 Claims**

1. A herbicidal composition comprising a herbicidal amount of a benzofuranyl compound of the formula



wherein R is a member selected from the group consisting of alkyl of 1 to 8 carbon atoms, alkenyl of 2 to 4 carbon atoms, monochloro alkenyl of 2 to 4 carbon atoms, alkynyl of 2 to 6 carbon atoms, monochloro alkynyl of 2 to 6 carbon atoms, alkoxyalkyl of 2 to 8 carbon atoms; R^1 is hydrogen or alkyl of 1 to 4 carbon atoms; R^2 and R^3 are the same or different and are hydrogen or alkyl of 1 to 4 carbon atoms; R^5 is alkyl of 1 to 4 carbon atoms or monochloro alkyl of 1 to 4 carbon atoms; and R^4, R^6 and R^7 are the same are different and are hydrogen, halogen or alkyl of 1 to 4 carbon atoms, with an inert carrier or wetting agent.

4,072,496

2,6-DICHLOROBENZALDEHYDE TETRAHYDRO-2-FUROYL HYDRAZONE AND ITS USE AS A RIPENER FOR SUGARCANE

Louis G. Nickell, Ellicott City, Md., assignor to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 458,430, April 5, 1974, Pat. No. 3,992,186. This application Aug. 3, 1976, Ser. No. 711,145

Int. Cl.² A01N *9/00*

U.S. Cl. 71—88 **5 Claims**

1. A process for modifying the ripening of field grown sugarcane so as to increase its yield of sucrose which comprises applying an amount effective to increase the amount of sucrose of 2,6-dichlorobenzaldehyde tetrahydro-2-furoyl hydrazone to the cane at a time from 2 to 10 weeks prior to harvest.

4,072,497

(5-ALKYLUREIDO-1,3,4-THIADIAZOL-2-YL-THIO) ACETIC ACID TERT-BUTYL ESTERS AND HERBICIDAL COMPOSITIONS AND PROCESSES

Friedrich Arndt, and Ludwig Nüsslein, both of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

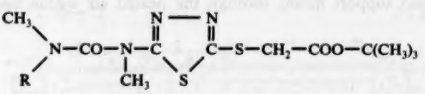
Filed Jan. 14, 1977, Ser. No. 759,560

Claims priority, application Germany, Jan. 16, 1976, 2601987

Int. Cl.² A01N *9/12*; C07D *285/12*

U.S. Cl. 71—90 **6 Claims**

1. (5-alkylureido-1,3,4-thiadiazol-2-yl-thio)-acetic acid ester of the formula



wherein R is hydrogen or methyl.

4. A herbicidal composition comprising from about 10 to 80% by weight of one or more of the esters defined in claim 1 and from about 90 to 20% by weight of a liquid or solid carrier material or a mixture of liquid and solid carrier materials.

6. A process of applying the composition of claim 4 to agricultural land for destruction, inhibition or reduction of undesirable weeds, comprising applying the said composition in an amount to provide for about 0.4 to 1.5 kg of active agents per about 2.5 acres of land.

4,072,498

PYRAZOLE AMIDES

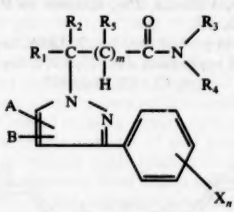
Malcolm W. Moon, and Gabriel Kornis, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 524,231, Nov. 15, 1974, abandoned. This application May 14, 1976, Ser. No. 686,548

Int. Cl.² A01N *9/22*; C07D *231/16, 231/12*

U.S. Cl. 71—92 **122 Claims**

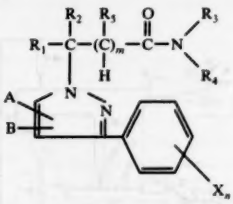
1. A compound of the formula:



where R_1 is hydrogen, alkyl of 1 to 7 carbon atoms, inclusive, haloalkyl of 1 to 7 carbon atoms, inclusive, phenyl, benzyl or cycloalkyl of 3 to 6 carbon atoms, inclusive, with the proviso that when R_1 is benzyl or cycloalkyl, $m = O$; R_2 and R_5 are the same or different and are hydrogen, halogen, alkyl of 1 to 6 carbon atoms, inclusive, haloalkyl of 1 to 6 carbon atoms, inclusive, or phenyl; R_1 and R_2 together with the attached carbon atom can be cycloalkyl of 3 to 6 carbon atoms, inclusive, when $m = O$; m is O or 1 provided that when $m = O$, R_1 is not hydrogen and when $m = 1$ at least one of R_2 or R_5 is hydrogen; R_3 is hydrogen, alkyl of from 1 to 8 carbon atoms, inclusive, phenyl or benzyl; R_4 is hydrogen, or alkyl of from 1 to 6 carbon atoms, inclusive, and R_3 and R_4 can be joined together to form a heterocyclic ring selected from the group consisting of pyrrolidine and piperidine; A and B are the same or different and are hydrogen, alkyl of from 1 to 6 carbon atoms, inclusive, phenyl, halogen, cyano, haloalkyl of 1 to 6 carbon atoms, inclusive, alkoxy or alkylthio in which the alkyl group is from 1 to 3 carbon atoms, inclusive or trifluoromethyl and when adjacent can

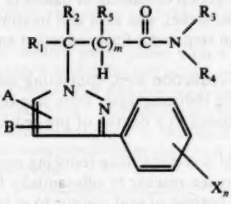
be joined to form a ring of from 5 to 7 carbon atoms, inclusive; X is halogen, nitro, cyano, acetyl, dimethylcarbamoyl, alkyl, haloalkyl, alkoxy or carboalkoxy in which the alkyl group is from 1 to 3 carbon atoms, inclusive, phenyl, benzyl, 2-phenylethyl and *n* is 0, 1, or 2; or an acid addition salt thereof.

121. A method for controlling weeds or undesirable vegetation which comprises applying to the locus thereof a herbicidally effective amount of a compound of the formula:



where R_1, R_2, R_3, R_4, R_5, *m*, X, *n*, A and B are as defined in claim **1**.

122. A composition for herbicidal use comprising an inert adjuvant and, as the active ingredient, an effective amount of a compound of the formula:



where R_1, R_2, R_3, R_4, R_5, *m*, X, *n*, A and B are as defined in claim **1**.

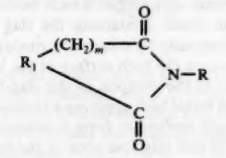
4,072,499

USE OF PYRIDYL PHTHALIMIDES AS PLANT GROWTH REGULANTS

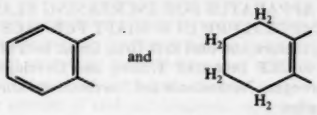
Frederic G. Bollinger, and John J. D'Amico, both of St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 22, 1976, Ser. No. 753,394
Int. Cl.[2] A01N *9/22*
U.S. Cl. 71—94 **6 Claims**

1. A method of regulating the growth of leguminous plants which comprises treating said leguminous plants with an plant growth regulating effective non-lethal amount of a compound of the formula



wherein R is pyridyl having one halo substituent, one lower alkyl substituent or two lower alkyl substituents; R_1 is selected from the group consisting of



and *m* is zero or one.

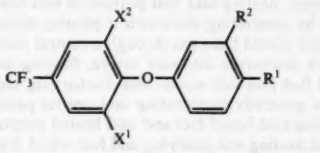
4,072,500

HALOGENATED 4-TRIFLUOROMETHYL-DIPHENYL-ETHER COMPOUNDS AND HERBICIDAL COMPOSITIONS

Lothar Rohe, Wuppertal; Jürgen Schramm, Dormagen; Erich Klauke, Odenthal-Hahnenberg; Ludwig Eue, and Robert Rudolf Schmidt, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 483,331, June 26, 1974, Pat. No. 3,957,865. This application Feb. 27, 1976, Ser. No. 662,066
Claims priority, application Germany, July 3, 1973, 2333848
Int. Cl.[2] A01D *9/12;* **A01N** *9/14;* **C07C** *149/34*
U.S. Cl. 71—98 **11 Claims**

1. Halogenated 4-trifluoromethyl-diphenyl ether compound of the formula



(I)

in which

R^1 is alkylthio of from 1 to 4 carbon atoms;

R^2 is hydrogen or methyl;

X^1 is halogen; and

X^2 is hydrogen or halogen.

4,072,501

METHOD OF PRODUCING HOMOGENEOUS MIXED METAL OXIDES AND METAL-METAL OXIDE MIXTURES

Thomas C. Quinby, Kingston, Tenn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 13, 1977, Ser. No. 787,128
Int. Cl.[2] B22F *1/02;* **C21C** *15/00;* **C22B** *5/02;* **C22C** *43/00*
U.S. Cl. 75—.5 BC **10 Claims**

1. A method of preparing particulate metal or metal oxide of controlled particle size comprising:

a. contacting an aqueous solution containing dissolved metal values with excess urea at a temperature sufficient to cause urea to react with water in said aqueous solution to provide a molten urea solution containing said metal values;

b. heating said molten urea solution containing metal values to cause said metal values to precipitate forming a mixture containing precipitated metal values;

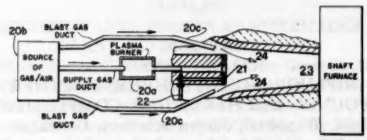
c. heating said mixture containing precipitated metal values to evaporate volatile material from said mixture, leaving a dry powder containing said metal values.

4,072,502

METHOD APPARATUS FOR INCREASING BLAST GAS TEMPERATURE IN A SHAFT FURNACE

Sven Santén, Hofors, and Carl Erik Grip, Lulea, both of Sweden, assignors to SKF Industrial Trading and Development Co. B.V., Nieuwegein, Netherlands and Norrbottens Jarnverk AB, Lulea, Sweden

Division of Ser. No. 449,784, March 11, 1974, Pat. No. 3,970,290. This application Sept. 19, 1975, Ser. No. 614,857
Claims priority, application Sweden, Mar. 26, 1973, 7343333
Int. Cl.[2] C21C 5/52
U.S. Cl. 75—11 5 Claims



1. In a method of reducing ores in a shaft furnace which includes a tuyere and is operable with a first source of fuel fed into the upper part of the furnace, a source of blast gas, and means for flowing said gas through said tuyere into said furnace, the improvement in combination therewith comprising the steps: providing a source of additional fuel comprising a liquid hydrocarbon for increasing the blast gas temperature, providing a plasma burner, dividing said blast gas into first and remaining portions, flowing said first portion of said blast gas into said burner, heating said first portion of said blast gas in said burner by generating therewith a plasma, flowing said heated portion of said blast gas through a central passage in a nozzle which discharges into said tuyere, flowing said additional liquid fuel into said nozzle and discharging same in an annular flow generally surrounding said central passage, and thereby mixing said liquid fuel and said heated portion of the blast gas, and heating and gasifying said fuel which forms with said heated portion of the blast gas a first mixture, intermixing in said tuyere said first mixture and said remaining portion of said blast gas, thus forming a second mixture, and flowing said second mixture into said furnace at said tuyere level, where said additional fuel is substantially completely burned.

4,072,503

THERMAL TREATMENT OF LEACHING RESIDUE FROM HYDROMETALLURGICAL ZINC PRODUCTION

Stig Arvid Petterson, Skalleftehamn, Sweden; Tor Lindstad, Bjorkmyr, Norway; Frøystein Dyvik, Odda, Norway, and Georg Steintveit, Odda, Norway, assignors to Det Norske Zinkkompani A/S, Odda, Norway

Filed Mar. 19, 1975, Ser. No. 559,706
Claims priority, application Norway, Mar. 21, 1974, 741026
Int. Cl.[2] C22D 7/06
U.S. Cl. 75—14 13 Claims

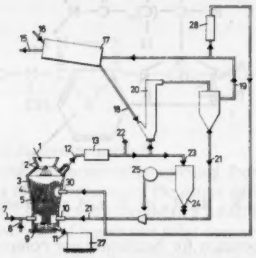
1. A method of treating residual material from the hydrometallurgical production of zinc which material consists of the leaching residue, iron precipitates from the leaching solution or mixtures of both from such production and which material contains zinc, lead and iron which method comprises heating and melting said residual material in a reactor under oxidation conditions at partial oxygen pressure to form lead oxide from the lead present in said residual material by supplying air to said material during such heating; said partial oxygen pressure being at least sufficient to prevent formation of lead sulphide; thereafter heating the oxidized material to fume off zinc in its elemental form by the addition of a reducing agent in a quantity sufficient to provide a partial oxygen pressure low enough to substantially reduce the lead and zinc yet high enough to avoid the simultaneous reduction of iron present; thereafter recovering at least the zinc from the fume and the lead as a melt; and the iron remaining in a slag.

4,072,504

METHOD OF PRODUCING METAL FROM METAL OXIDES

Örn Gunnar Perdahl, Lulea, and Sven Oscar Santen, Hofors, both of Sweden, assignors to Aktiebolaget Svenska Kullagerfabriken, Goteborg, Sweden

Continuation of Ser. No. 435,520, Jan. 22, 1974, abandoned. This application Mar. 24, 1976, Ser. No. 669,863
Claims priority, application Sweden, Jan. 26, 1973, 7301099
Int. Cl.[2] C21B 11/00
U.S. Cl. 75—40 6 Claims



1. A method for producing liquid metal from metal oxides selected from the group consisting of oxides of tungsten, chromium, manganese, nickel, and iron and mixtures thereof by a first pre-reduction step and a final reduction and melting step, comprising;

(a) as said pre-reduction step, contacting said metal oxides with outgoing reducing gases from step (d) to pre-reduce said metal oxides to a degree of pre-reduction of at least 33%;

(b) feeding solid non-particulate reducing material to the top of a shaft furnace reactor to substantially fill said reactor;

(c) heating the bottom of said reactor to at least the melting point of the metal being produced to supply sufficient heat energy to cover the heat demand for said final reduction and melting step; and

(d) as said final reduction and melting step, blowing said pre-reduced metal oxides with a carrier gas through tuyeres into the bottom of said substantially filled reactor to contact said pre-reduced metal oxides with said solid reducing material to completely reduce said metal oxides and produce liquid metal and reducing gas.

4,072,505

METHOD OF SLAGGING MOLTEN METAL

Peter Hausen, and Klaus-Dieter Schulz, both of Dortmund, Germany, assignors to Hoesch Werke Aktiengesellschaft, Dortmund, Germany

Filed Oct. 6, 1976, Ser. No. 729,941
Claims priority, application Germany, Oct. 9, 1975, 2545262; Dec. 19, 1975, 2557362; Dec. 19, 1975, 2557361; Mar. 17, 1976, 2611203
Int. Cl.[2] C21C 7/00
U.S. Cl. 75—61 12 Claims

1. A method of removing slag from metal baths, in metallurgical vessels by means of a rabble, which includes the steps of: slightly tilting the vessel containing the slag covered metal bath while simultaneously by means of a rinsing gas first creating a slag-free zone on the bath surface at the lifted side of the vessel, subsequent to the creation of the slag-free zone at the temperature of the metal bath applying a synthetic slag powder to the slag-free bath surface to form a coherent viscous slag, placing a rabble on said slag-free zone of the bath surface, and moving said rabble substantially along the plane of said slag-free bath surface zone in the direction toward the lowered side of said vessel thereby pushing the collectively melted synthetically entrapped proceeding slag with the aid of said rabble for

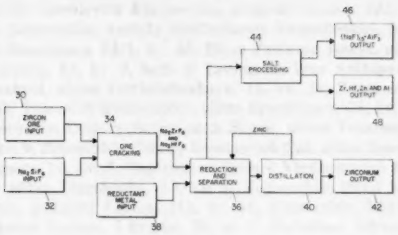
removal thereof toward and over the lowered rim arc of said vessel.

4,072,506

METHOD OF SEPARATING HAFNIUM FROM ZIRCONIUM

Joseph Allen Megy, Corvallis, Oreg., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Oct. 17, 1975, Ser. No. 623,325
Int. Cl.[2] C22B *34/14*
U.S. Cl. 75—63 **17 Claims**



1. The method of separating hafnium from zirconium, which comprises the steps of:

preparing a molten metal phase which comprises a solution of unseparated zirconium and hafnium and a solvent metal; and

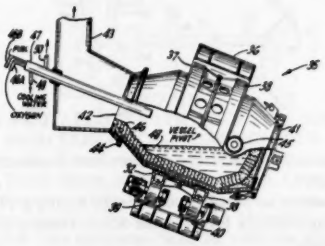
contacting the molten metal phase with a fused salt phase which includes a zirconium salt as one of its components, whereby zirconium and hafnium separation is effected by mutual displacement, with hafnium being transported from the molten metal phase to the fused salt phase while zirconium is transported from the fused salt phase to the molten metal phase.

4,072,507

PRODUCTION OF BLISTER COPPER IN A ROTARY FURNACE FROM CALCINED COPPER-IRON CONCENTRATES

Harold P. Rajcevic, Colonia; William R. Opie, Holmdel, and Dominic C. Cusanelli, South Plainfield, all of N.J., assignors to Amax Inc., Greenwich, Conn.

Division of Ser. No. 582,181, May 30, 1975, Pat. No. 4,006,010. This application July 29, 1976, Ser. No. 709,704
Int. Cl.[2] C22B *15/00*
U.S. Cl. 75—74 **11 Claims**



1. A method for the production of blister copper from copper-iron concentrate containing about 15 to 45% Cu, about 15 to 40% Fe, about 20 to 45% S, the total Cu, Fe and S content being at least about 85% and the balance gangue and residual metals which comprises,

dead roasting said sulfide concentrate at a temperature above 800° C to remove the sulfur therefrom and form a calcine containing ferric iron oxide as evidenced by the presence of substantial amounts of magnetic copper ferrite,

forming a smeltable charge in a rotary furnace comprising said calcine mixed with particulate carbonaceous reducing agent correlated to reduce copper oxide in said calcine and reduce said ferric iron oxide to FeO,

the amount of said carbonaceous reducing agent ranging from about 4 to 10% by weight of said calcine,

said charge also containing slag-forming constituents comprising SiO_2 proportioned to combine with reduced iron oxide and provide a slag having a melting point below 1250° C and having an Fe/SiO_2 ratio of about 1.2:1 to 4:1,

subjecting said charge to heating to a smelting temperature above the melting point of copper by directing a combusting stream of oxygen and a hydrocarbon fuel axially into said rotatable furnace from one end thereof while causing said charge to cascade by rotating said furnace,

the ratio of said oxygen to said hydrocarbon fuel being at least sufficient to effect substantially complete combustion of said fuel plus an excess of oxygen ranging from about 3% to 10% by volume,

continuing cascading said charge in said furnace, the residence time of said charge in said furnace being sufficient to reduce rapidly the copper oxide to molten blister copper containing less than about 1% iron and to form a molten fluid slag,

and then separating said blister copper from said slag.

4,072,508

METHOD FOR RECOVERING PALLADIUM FROM SPENT PALLADIUM CATALYSTS

Ludek Vodicka; Ivo Peka, and Voktor Suchy, all of Praha, Czechoslovakia, assignors to Vysoka skola chemicko-technologicka, Praha, Czechoslovakia

Filed Dec. 17, 1976, Ser. No. 751,791
Claims priority, application Czechoslovakia, Dec. 29, 1975, 8998/75
Int. Cl.[2] C22B *11/04*
U.S. Cl. 75—121 **5 Claims**

1. A method for recovering palladium values from spent palladium catalysts and ash thereof which comprises the steps of fluorinating the spent catalyst and ash at a temperature which increases gradually from 200° - 500° C and decomposing palladium fluorides so obtained with a mineral acid at a temperature ranging from 90° - 100° C to obtain palladium values in solution.

4,072,509
STEEL FOR NUCLEAR APPLICATIONS

Nikolai Nikolaevich Zorev, ulitsa Novinki, 6, kv. 23; Anatoly Alexandrovich Astafiev, Sharikopodshipnikovskaya ulitsa, 2, kv. 34; Alexandr Sergeevich Loboda, Otkrytoe shosse, 6, korpus 3, kv. 48; Vladimir Pavlovich Savukov, Simonovsky val, 19, kv. 21; Andrei Efimovich Runov, Zatonnaya ulitsa, 17, kv. 51, all of Moscow; Vladimir Alexandrovich Belov, Kolpino, ulitsa Very Slutskoi, 9, kv. 20, Leningrad; Jury Vasilievich Sobolev, prospekt Lenina, 10, kv. 10, Leningrad; Valentin Vasilievich Sobolev, Kolpino, ulitsa Pavlovskaya, 84, kv. 43, Leningrad; Nikolai Mikhailovich Pavlov, Kolpino, ulitsa Gromova, 16, kv. 50, Leningrad; Boris Evgenievich Paton, ulitsa Chkalova, 41a, kv. 26; Boris Izrailevich Medovar, ulitsa Anri Barbjusa, 22/26, kv. 109, both of Kiev; Jury Fedorovich Balandin, ulitsa Basseinaya, 117, korpus 1, kv. 35, Leningrad; Igor Vasilievich Gorynin, ulitsa Gromova, 16, kv. 50, Leningrad; Jury Ivanovich Zvezdin, Kostromskoi prospekt, 42, kv. 23, Leningrad; Kuzma Makeevich Ivanov, Nevsky prospekt, 175, kv. 3, Leningrad; Viktor Alexandrovich Ignatov, ulitsa Sofii Kovalevskoi, 10, korpus 2, kv. 169, Leningrad, and July Georgievich Emelyanenko, ulitsa Darvina, 5, kv. 5, Kiev, all of U.S.S.R.

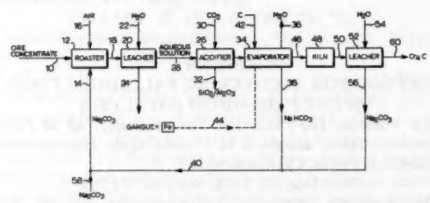
Filed Jan. 5, 1977, Ser. No. 756,972
Int. Cl.[2] C22C *38/42*
U.S. Cl. 75—124 **1 Claim**

1. A steel consisting essentially of in percent by weight:
carbon from 0.13 to 0.18,
silicon from 0.17 to 0.37,
manganese from 0.30 to 0.60,
chromium from 1.7 to 2.4,
nickel from 1.0 to 1.5,
molybdenum from 0.5 to 0.7,
vanadium from 0.05 to 0.12,
aluminium from 0.01 to 0.035,
nitrogen from 0.005 to 0.012,
copper from 0.11 to 0.20,
arsenic from 0.0035 to 0.0055,
iron and impurities — the balance.

4,072,510
PRODUCTION OF FERROCHROME ALLOY

Allan M. Smellie, Mississauga, and Hans G. Brandstatter, Welland, both of Canada, assignors to Ontario Research Foundation, Mississauga, Canada

Division of Ser. No. 539,246, Jan. 7, 1975, Pat. No. 4,009,247, which is a continuation-in-part of Ser. No. 480,829, June 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 386,019, Aug. 6, 1973, abandoned. This application May 12, 1976, Ser. No. 685,816
Int. Cl.[2] C22C *39/14*
U.S. Cl. 75—130.5 **6 Claims**

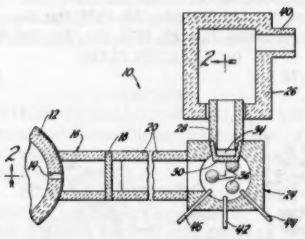


1. A process for the production of a ferrochrome alloy, which comprises forming an intimate admixture of finely-divided carbon, sodium chromate or sodium dichromate and an iron oxide, and reducing said sodium chromate or sodium dichromate and said iron oxide by an in situ solid state reaction in a reaction zone to form a ferrochrome alloy, said intimate admixture containing sufficient proportions of the components thereof to provide a ferrochrome alloy from said reducing step containing 55 to 66% Cr, 7 to 8% C and the balance Fe, said solid state reaction being carried out at a temperature of about 1025° C to about 1425° C while carbon monoxide formed in said solid state reaction is removed from said reaction zone.

4,072,511
METHOD OF PRODUCING SILICON CONTAINING CAST IRON

John D. Coyle, Cedarville, Mich., assignor to Harold Huston, Tonawonda, N.Y. and Ronald Beyerstedt, Wapaca, Wis.

Filed Nov. 26, 1976, Ser. No. 744,985
Int. Cl.[2] C22C *33/08*
U.S. Cl. 75—130 R **12 Claims**



1. A method of producing cast iron in a cupola comprising the steps of:
(a) providing an initial cupola charge having a silicon content significantly less than the silicon content required in the melt,
(b) loading and melting the charge in a cupola,
(c) conducting the molten metal to a mixing vessel,
(d) increasing the silicon content by a substantially continuous addition of commercially pure granular silicon carbide to the mixing vessel while simultaneously agitating the molten metal by external means to an extent sufficient to bring the silicon into solution with the molten metal and
(e) conducting the silicon-enriched molten metal away from the mixing vessel.

4,072,512

CHARGE FOR MANUFACTURING ALUMINIUM-SILICON ALLOYS

Jury Ivanovich Brusako, Novo-Izmailovksy prospekt, 37, kv. 42; Sergei Alexandrovich Rzhavin, 17 Iinia, 18, kv. 94; Vasily Pavlovich Kiselev, ulitsa Lensoveta, 48, kv. 10; Mikhail Sergeevich Tarasov, ulitsa Shevchenko, 24, kv. 32; Vladimir Mendeleevich Rapoport, ulitsa Bulvarnaya, 117, kv. 12; Vladimir Vasilievich Timofeev, Gavanskaya ulitsa, 37, kv. 39, all of Leningrad; Raisa Ivanovna Ragulina, prospekt Metallurgov, 21, kv. 40, Zaporozhie; Miro Khristoforovich Alivoivodich, ulitsa 40 let Sovetskoi Ukrainy, 46, kv. 21, Zaporozhie; Anatoly Gavrilovich Kucherenko, prospekt Lenina, 192, kv. 159, Zaporozhie; Anatoly Mikhailovich Varjushenkov, prospekt Shaumiana, 52/1, kv. 45; Elena Pavlovna Isaeva, ulitsa P.Lavrova, 62, kv. 3, both of Leningrad; Ivan Arkhipovich Berezhnoi, ulitsa Patrioticheskaya, 15, kv. 20, Zaporozhie; Vasily Petrovich Rumyantsev, ulitsa Sportivnaya, 25, kv. 62, Zaporozhie; Grigory Safronovich Shpak, ulitsa Tennisnaya, 16, kv. 9, Zaporozhie; Dmitry Semenovich Guz, ulitsa Levoberezhnaya, 14, kv. 5, Zaporozhie; Dmitry Vladimirovich Ilinkov, ulitsa Tregubenko, 13, kv. 5, Zaporozhie; Pavel Ilich Volpin, prospekt Lenina, 210, kv. 16, Zaporozhie; Mikhail Pavlovich Avdeev, 7 kvartal, 30, kv. 7, Shelekhov, Irkutskoi oblasti; Stanislav Arsentievich Artemenko, prospekt Stalevarov, 25a, kv. 27, Zaporozhie, and Ljudmila Pavlovna Khrennikova, ulitsa Dzerzhinskogo, 70, kv. 5, Leningrad, all of U.S.S.R.

Continuation of Ser. No. 591,696, June 30, 1975, abandoned, which is a continuation of Ser. No. 174,532, Aug. 24, 1971, abandoned. This application June 1, 1976, Ser. No. 691,519

Claims priority, application U.S.S.R., Nov. 11, 1970, 1485663; Nov. 11, 1970, 1485661; Nov. 11, 1970, 1485659

Int. Cl.[2] C22C *21/02*

U.S. Cl. 75—148 4 Claims

1. A charge for manufacturing aluminium-silicon alloys, comprising a silica-alumina material and a carbonaceous reducing agent which comprises a mixture of petroleum coke and carbon black, the ratio of petroleum coke to carbon black, as referred to non-volatile carbon content in the charge, ranges from 3.0:1 to 0.5:1.

4,072,513

COPPER BASE ALLOYS WITH HIGH STRENGTH AND HIGH ELECTRICAL CONDUCTIVITY

Stanley Shapiro, New Haven; Eugene Shapiro, Hamden; Brian Mravic, North Haven, and W. Gary Watson, Cheshire, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 559,307, March 17, 1975, Pat. No. 4,007,039. This application Sept. 20, 1976, Ser. No. 724,415

Int. Cl.[2] C22C *9/00*

U.S. Cl. 75—164 5 Claims

1. A high conductivity and high strength copper base alloy consisting essentially of 0.8 to 5% by weight titanium as a first component, 1.2 to 5% by weight of a second component selected from the group consisting of antimony, phosphorus, silicon, arsenic, germanium, tin and mixtures thereof, balance copper, wherein the first and second components are present at an atomic ratio of not more than 10% above 5 atoms of said first component per 3 atoms of said second component.

4,072,514

MAGNESIUM COMPOSITES AND MIXTURES FOR HYDROGEN GENERATION AND METHOD FOR MANUFACTURE THEREOF

Masahiro Suzuki, 423, Yasaka, Kakegawa, Shizuoka, Japan

Division of Ser. No. 451,141, March 14, 1974, Pat. No. 3,957,483, which is a continuation-in-part of Ser. No. 242,790, April 10, 1972, abandoned. This application Mar. 8, 1976, Ser. No. 665,115

Claims priority, application Japan, Apr. 20, 1971, 46-10288

Int. Cl.[2] C22C *23/00;* C01B *1/07*

U.S. Cl. 75—168 R 2 Claims

1. A method for the manufacture of a magnesium mixture capable of inducing generation of hydrogen upon reaction with water in the presence of one member selected from the group consisting of NaCl and KCl, which method is characterized by melting magnesium, adding to the molten magnesium 0.01 to 30% by weight based on magnesium of an iron-containing powder selected from the group consisting of iron and iron oxide powder having a particle diameter not larger than 200 mesh; dispersing the iron-containing powder in the molten magnesium; and thereafter cooling the resultant mixture.

4,072,515

ELECTRICAL CONTACT MATERIAL

Kenya Motoyoshi; Masahiro Kume, and Yoshinari Amano, all of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed July 3, 1974, Ser. No. 485,579

Claims priority, application Japan, July 5, 1973, 47-762654

Int. Cl.[2] C22C *5/06*

U.S. Cl. 75—173 A 3 Claims

1. An electrical contact material of silver-indium oxide type, which is produced by the internal oxidation of an alloy consisting of 6–15% by weight indium, 0.2–8% by weight tin, 0.01–1% by weight magnesium and the balance silver.

4,072,516

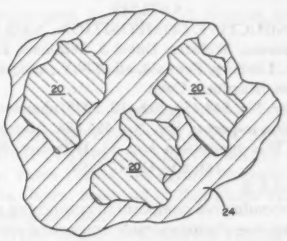
GRAPHITE FIBER/METAL COMPOSITES

Roger T. Pepper, Cape Elizabeth, and Thomas A. Zack, Scarborough, both of Maine, assignors to Fiber Materials, Inc., Biddeford, Maine

Filed Sept. 15, 1975, Ser. No. 613,333

Int. Cl.[2] H01B *1/04;* H01C *1/04*

U.S. Cl. 75—229 7 Claims



1. A composite product comprising a plurality of carbon fibers each having a coating of a mixture of silicon oxide and silicon carbide, said fibers being disposed in a substantially solid matrix of metal.

2. A composite as defined in claim 1 wherein said metal is a carbide forming metal selected from the group consisting of aluminum, magnesium, titanium, nickel, alloys of said metals, and alloys which comprise one of said metals in major proportion.

4,072,517
MIGRATION IMAGING METHOD

William L. Goffe, Webster, and Joseph Mammino, Penfield, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 572,762, April 29, 1975, abandoned, which is a division of Ser. No. 181,990, Sept. 20, 1971, Pat. No. 3,933,491, which is a continuation-in-part of Ser. No. 837,592, June 30, 1969, which is a continuation-in-part of Ser. No. 553,837, May 31, 1966, abandoned, and Ser. No. 837,591, June 30, 1969, Pat. No. 4,013,462. This application July 19, 1976, Ser. No. 706,318

Int. Cl.[2] G03G *13/22*

U.S. Cl. 96—1 PS **25 Claims**

1. An imaging method comprising the steps of:

a. providing an imaging member comprising a photoconductive softenable material layer containing migration marking particles;

b. electrically charging said member;

c. exposing said member to an image pattern of activating radiation and;

d. developing an image by decreasing the resistance of the photoconductive softenable material to migration of migration marking particles through the photoconductive softenable material whereby selected portions of the migration marking particles imagewise migrate in depth in the softenable layer.

4,072,518
METHOD OF MAKING TRIGONAL SELENIUM INTERLAYERS BY GLOW DISCHARGE

Lewis B. Leder, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 30, 1976, Ser. No. 755,704

Int. Cl.[2] G03G *5/082;* **B05D** *3/06*

U.S. Cl. 96—1.5 R **8 Claims**

1. A method for controlling the amount of crystalline photoconductive selenium or selenium alloy material initially applied to a xerographic base or substrate comprising exposing the base or substrate, as a cathode, to a vapor cloud comprising uncharged photoconductive material plus oppositely charged high energy photoconductive material and inert gaseous ions; the vapor cloud being obtained essentially by vaporizing selenium or selenium alloy in a vacuum coater in convenient proximity to a glow discharge in the presence of an inert ion-forming gas and thereafter exposing the base or substrate to an un-ionized vapor cloud at least initially comprising selenium and at least .3% by weight arsenic.

4,072,519
PHOTOCONDUCTIVE COMPOSITION, AND ELEMENT

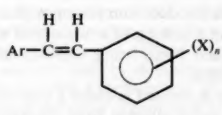
James M. Pearson, Webster; David J. Williams, Fairport, and William W. Limburg, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 548,455, Feb. 10, 1975, abandoned, which is a continuation-in-part of Ser. No. 454,484, March 25, 1974, abandoned. This application Aug. 11, 1976, Ser. No. 713,475

Int. Cl.[2] G03G *5/04*

U.S. Cl. 96—1.5 R **9 Claims**

1. A photoconductive composition comprising a solid solution of at least one photogenerator compound represented by the formula



wherein

Ar is indolyl, N-alkyl 2-carbazyl, julolidinyl and the substituted analogues thereof, wherein said substituents are capable of releasing electrons to the relatively electron deficient centers within the compound;

X is $-NO_2$ or halogen; and

n is from 1 to 5

and an insulating polymeric matrix, said polymeric matrix being capable of rapid and efficient transport of charge carriers of at least one polarity.

4,072,520
ELECTROPHOTOGRAPHIC DUAL LAYER RECORDING MATERIAL

Jürgen Rochlitz, Breckenheim, and Gunter Schön, Wiesbaden, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Apr. 25, 1973, Ser. No. 354,320

Claims priority, application Germany, Aug. 30, 1972, 2242595

Int. Cl.[2] G03Q *5/06*

U.S. Cl. 96—1.5 R **6 Claims**

1. An electrophotographic recording material comprising an electroconductive support material with a photoconductive double layer of organic materials composed of a homogeneous, uniform, opaque, charge carrier producing layer of tightly packed dyestuff molecules, prepared by high vacuum evaporation of the dyestuff, and a transparent top layer of insulating materials with at least one charge transporting compound, in which the organic dyestuff layer is composed of a compound of the general formula

$$R_1—CH=N(—A—N=CH)_n—R_2 \text{ or}$$
$$R_1—N=CH—A—CH=N—R_2$$

in which

R_1 and R_2 are identical or different and stand for an optionally substituted phenyl, styryl, crabazyl, anthryl, pyrenyl of fluorenyl group,

n is 0 or 1, and

A is a optionally substituted aromatic and/or heterocyclic ring system selected from the group consisting of benzene, diphenyl, naphthalene, pyrene, perylene, diphenylether, diphenylamine, benzophenone, oxazole, imidazole, pyrazole, thiazole, oxadiazole, bisphenyl-oxadiazole, benzbis-thiazole, carbazole and xanthene groups,

and in which the transparent top layer is composed of a mixture of a charge transporting oxadiazole compound having an extended π-electron system, which recording material is useful in an electrophotographic copying process with negative charging of the top layer, if an electron-donating compound is used, and is useful in an electrophotographic copying process with positive charging of the top layer, if the top layer contains an electron-accepting compound.

4,072,521
AMIDES OF ω — AND CIS ALKENOIC ACIDS IN IMAGING PROCESS AND ELEMENT

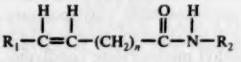
Charles G. Scouten, Webster, N.Y., and Willard C. Hamilton, Morganville, N.J., assignors to Xerox Corporation, Stamford, Conn.

Filed June 3, 1976, Ser. No. 692,262

Int. Cl.[2] G03Q *13/22, 5/02, 5/04*

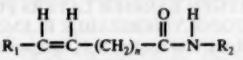
U.S. Cl. 96—1.5 R **27 Claims**

1. In an imaging process comprising the steps of forming a latent image on an imaging surface, developing said latent image by bringing a developing material within the influence of said latent image to form a powder image corresponding to said latent image, and removing at least a portion of at least any residual developed image from said imaging surface; the improvement comprising treating said imaging surface with an effective amount of a deposit forming material comprising amides of the structure



where R_1 is H or an alkyl group of 1 to about 18 carbon atoms, and n is an integer having a value such that the total number of carbon atoms is from about 10 to about 22 and where R_2 is H, phenyl, lower alkyl substituted phenyl, and lower alkyl groups where lower alkyl includes from 1 to about 7 carbon atoms in branched, straight chained, or cyclic configuration.

14. An imaging member wherein the imaging surface of said imaging member is provided with an adherent deposit of a material comprising amides of the structure



where R_1 is H or an alkyl of 1 to about 18 carbon atoms, and n is an integer having a value such that the total number of carbon atoms is from about 10 to about 22, and where R_2 is H, phenyl, lower alkyl substituted phenyl, and lower alkyl groups where lower alkyl includes from 1 to about 7 carbon atoms in either branched, straight chained, or cyclic configuration.

4,072,522

METHOD OF TREATING PHOTOCONDUCTIVE ZINC OXIDE

Hajime Miyatuka, Asaka, Japan, assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 583,074, June 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 193,482, Oct. 28, 1971, abandoned. This application Nov. 15, 1976, Ser. No. 741,588

Int. Cl.[2] G03G *5/08*

U.S. Cl. 96—1.8 **5 Claims**

1. A method of treating photosensitive zinc oxide to enhance its suitability for obtaining improved continous tone imaging and liquid development, comprising dispersing photosensitive zinc oxide particles uniformly in a distribution promoting liquid agent containing at least one of chloric acid, nitric acid, acetic acid, oxalic acid or formic acid applied in a concentration of about 10^{-4} to 10^{-6} mole of acid per gram of zinc oxide; and heat treating the uniformly dispersed and dried material in a temperature range of about 400° C. up to 700° C.

4,072,523

DEVELOPMENT OF PHOTOGRAPHIC SILVER HALIDE MATERIAL

Robert Joseph Pollet, Vremde; Francis Jeanne Sels, Kontich, and Camille Angelina Vandeputte, Mortsel, all of Belgium, assignors to AGFA-GEVAERT, N.V., Mortsel, Belgium

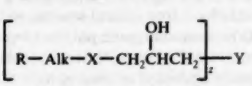
Filed Jan. 13, 1976, Ser. No. 648,723

Claims priority, application United Kingdom, Jan. 22, 1975, 2867/75

Int. Cl.[2] G03C *5/30, 1/48, 7/00, 7/16*

U.S. Cl. 96—22 **24 Claims**

1. A method of developing a photographic element containing imagewise developable silver halide wherein development occurs in the presence of a compound, incorporated in the element or in the developer, corresponding to the following general formula and containing in its molecule at least one thioether sulphur atom linked to two carbon atoms:



wherein:

R is hydrogen, hydroxy, hydroxyalkyl, alkoxy, alkylthio or alkylamino,

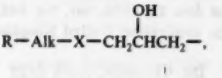
Alk is an alkylene group which may be interrupted by —O—, —S—, or —N(Q)— wherein Q is hydrogen or a C_1-C_5 alkyl group,

X is —O—, —S— or —N(Q)— wherein Q has the above meaning, and the value of z and the significance of Y are interdependent:

z being 1 for Y being hydroxy or the group —X'—Alk'—R' wherein X', Alk' and R' have the same significance as X, Alk and R,

z being 2 for Y being —O—, —S— or —N(Q)— wherein Q has the above meaning, and

z being a positive integer of at least 1 for Y being the residue of an aliphatic compound with more than one alcohol, thiol or amine function in which all or part of the alcohol-, thiol-, or amine-hydrogen atoms are replaced by the group



and

wherein the or at least one of the hydroxyl groups may have been converted into groups of the formula —OZA wherein Z is CO, SO_2 or CONH, and A is an alkyl or aryl group and wherein at least one of R, Alk, X and Y is or includes a thioether sulphur atom.

4,072,524

MIXTURES YIELDING THERMALLY STABLE PHOTO-CROSSLINKABLE LAYERS AND FOILS

Wolfgang Kleeberg, Erlangen; Roland Rubner, Rottenbach u Forchheim, and Wieland Bartel, Furth, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Dec. 3, 1975, Ser. No. 637,189

Claims priority, application Germany, Dec. 6, 1974, 2457882

Int. Cl.[2] G03C *5/00*

U.S. Cl. 96—35.1 **19 Claims**

1. A composition comprising a mixture of;

a. a triallyl cyanurate prepolymer and/or a precopolymer of triallyl cyanurate with a compound containing a radical selected from the group consisting of allyloxy, allylester and mixtures thereof; and

b. a compound containing at least one N-maleimide group wherein the C=C double bond of the N-maleimide group is bonded to two radicals selected from the group consisting of hydrogens, hydrogen and chlorine, and hydrogen and methyl.

4,072,525

SILVER HALIDE PHOTOGRAPHIC MATERIAL CONTAINING TWO-EQUIVALENT COLOR COUPLER

Kozo Inouye; Yukio Yokota, and Kiyoshi Nakazyo, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

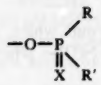
Filed Aug. 4, 1976, Ser. No. 711,746

Claims priority, application Japan, Aug. 8, 1975, 50-96435

Int. Cl.[2] G03C *7/00, 1/40*

U.S. Cl. 96—55 **27 Claims**

1. A method for forming color images which comprises developing a silver halide photographic light-sensitive material in the presence of a photographic color coupler in which a hydrogen atom at the coupling position capable of coupling with an oxidation product of an aromatic primary amine developing agent is substituted with the group represented by the following general formula:



wherein R and R', which may be the same or different, each represents an alkyl group, an alkenyl group, an aryl group, an alkoxy group, an alkylthio group, an aryloxy group, a hydroxy group or an amino group; R and R' can combine each other to form a ring, and X represents an oxygen atom or a sulfur atom.

4,072,526

DEVELOPMENT OF PHOTOGRAPHIC SILVER HALIDE MATERIAL

Jeanne Francis Jeanne Sels, Kontich; Robert Joseph Pollet, Vremde; Camille Angelina Vandeputte, Mortsel, and Jozef Frans Willems, Wilrijk, all of Belgium, assignors to AGFA-GEVAERT, N.V., Mortsel, Belgium

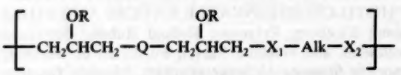
Filed Jan. 13, 1976, Ser. No. 648,722

Claims priority, application United Kingdom, Jan. 22, 1975, 2865/75

Int. Cl.[2] G03C *5/30, 1/28*

U.S. Cl. 96—66.3 **12 Claims**

1. Method of developing a photographic element containing imagewise developable silver halide wherein development occurs in the presence of a polyaddition compound, incorporated in the element or in the developer, said polyaddition compound being the reaction product of a diepoxide and a polyol under conditions to provide in said polyaddition compound recurring units of the following general formula, the recurring units containing at least one thioether sulphur atom linked to two carbon atoms:



wherein:

Q is —O—, —S—, —S alkylene S— or —O alkylene O— wherein the alkylene group may be interrupted by oxygen or sulphur,

each of X_1 and X_2 represents oxygen or sulphur,

Alk stands for alkylene which may be interrupted by oxygen or sulphur, and

R is hydrogen or COR_1, SO_2R_1 or $CONHR_1$ wherein R_1 is an alkyl group or an aryl group, and

wherein at least one of R, Q, X_1, Alk and X_2 is or comprises a thioether sulphur atom.

4,072,527

OXYGEN BARRIER LAYERS FOR PHOTOPOLYMERIZABLE ELEMENTS

Roxyni Fan, East Brunswick, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 292,501, Sept. 27, 1972, abandoned. This application June 3, 1976, Ser. No. 692,600

Claims priority, application Germany, Sept. 22, 1973, 2347784; Belgium, Sept. 26, 1973, 136064; Japan, Sept. 27, 1973, 48-108053

Int. Cl.[2] G03C *1/78*

U.S. Cl. 96—87 R **5 Claims**

1. A photopolymerizable element comprising, in order, (1) a support, (2) a solid photopolymerizable stratum, and (3) an adherent, solid, protective stratum over the entire area of said photopolymerizable stratum transparent to actinic radiation, said protective stratum having a thickness of 0.2 to 25 microns and being characterized in that it is (i) nonstrippable as an unsupported film, (ii) substantially impermeable to oxygen, and (iii) water permeable and composed of a macromolecular organic polymer or polymer mixture which is soluble in water or in a mixture of water and a water-miscible organic solvent, said protective stratum having dispersed therein, solid particles of at least one water-insoluble vinyl polymer taken from the group consisting of vinyl pyrrolidone-vinyl acetate copolymer, vinyl acetate-methyl methacrylate copolymer, poly(ethyl acrylate), and poly(methyl methacrylate-ethyl acrylatemethacrylate acid) terpolymer, said particles being at least 0.05 micron in diameter and being present in amounts from 10 to 60 percent by weight of the total polymer in said protective stratum.

4,072,528

OXYGEN BARRIER LAYERS FOR PHOTOPOLYMERIZABLE ELEMENTS

Martin Daniel Bratt, Old Bridge, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 292,503, Sept. 27, 1972, abandoned. This application June 3, 1976, Ser. No. 692,599

Claims priority, application Germany, Sept. 22, 1973, 2347784; Belgium, Sept. 26, 1973, 136064; Japan, Sept. 27, 1973, 48-108053

Int. Cl.[2] G03C *1/78*

U.S. Cl. 96—87 R **6 Claims**

1. A photopolymerizable element comprising, in order, (1) a support, (2) a solid photopolymerizable stratum, and (3) an adherent, solid, protective stratum over the entire area of said photopolymerizable stratum transparent to actinic radiation, said protective stratum having a thickness of 0.2 to 25 microns and being characterized in that it is (i) non-strippable as an unsupported film, (ii) substantially impermeable to oxygen, and (iii) water permeable and composed of a macromolecular organic polymer or polymer mixture which is soluble in water or in a mixture of water and a water-miscible organic solvent, said protective stratum having dispersed therein, solid particles of at least one water insoluble, chlorinated vinyl polymer selected from the group consisting of vinylidene chloride-acrylonitrile copolymer, vinylidene chloride-lower alkyl acrylate-itaconic acid terpolymer, poly(vinylidene chloride), and poly(vinylidene chloride-methyl methacrylate-itaconic acid) coethyl acrylate, said particles being at least 0.05 micron in diameter and being present in amounts from 10 to 60 percent by weight of the total polymer in said protective stratum.

4,072,529

GELLED PHOTOPOLYMER COMPOSITION AND METHODS OF MAKING THEM

Clayton W. Hoornstra, and Violete L. Stevens, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 20, 1975, Ser. No. 606,260

Int. Cl.[2] G03C *1/68;* **C08F** *8/00;* **C08G** *18/00*

U.S. Cl. 96—115 R **22 Claims**

1. A reversibly gelled composition, which is free radical-curable in an imagewise fashion by exposure to imagewise modulated actinic radiation and thereafter developable to form an article in relief, which gelled composition is a reaction product of a composition comprising:

Component (a) a first organic polymer bearing, per molecule, at least one ethylenic unsaturated group which is polymerizable by a free radical source; and

Component (b) a second organic polymer bearing, per molecule, at least two Z groups, wherein each Z is independently primary hydroxyl or mercapto;

with the proviso that when Component (a) bears at least two Z groups per molecule, Component (b) may be omitted.

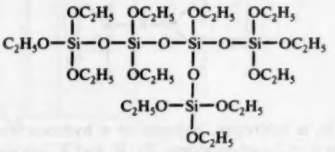
4,072,530

REFRACTORY FURNACE WALL COATING

Yasutel Hirame, Kawaguchi, and Youichi Nakamura, Hatogaya, both of Japan, assignors to Fuji Chemical Industries Company, Tokyo, Japan

Filed June 17, 1976, Ser. No. 697,266
Int. Cl.[2] C04B 35/52
U.S. Cl. 106—44 2 Claims

1. A refractory furnace wall coating composition comprising from about 45 to about 65% by weight of silicon carbide, from about 10 to about 15% by weight of a compound selected from the group consisting of stabilized zirconium oxide, bentonite, and a mixture thereof, from about 5 to about 10% by weight of silicon dioxide, from about 3 to about 5% by weight of a hydrolyzate of a poly (ethyl silicate), said hydrolyzate having the formula



from about 10 to about 20% by weight of a compound selected from the group consisting of sodium silicate, aluminum phosphate, and a mixture thereof, the balance being water, the percent being based on the weight of the composition.

4,072,531

PLUGGING COMPOSITIONS FOR BLAST FURNACE TAP HOLES

Kyohei Funabiki, and Tetsuya Tokunaga, both of Fujieda, Japan, assignors to Sumitomo Durez Company, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 639,679, Dec. 11, 1975. This application Mar. 12, 1976, Ser. No. 666,290
Claims priority, application Japan, Mar. 15, 1975, 50-30669
Int. Cl.[2] C04B 35/02, 35/66, 35/04, 35/66
U.S. Cl. 106—56 6 Claims

1. A blast furnace tap hole plugging composition comprising a condensate resin of a phenol and an aldehyde chemically modified by reaction under heating with a lignin selected from the group consisting of sulfite pulp lignin and kraft pulp lignin, present in an amount of about 5 to about 500 parts by weight per 100 parts by weight of phenol, a refractory filler, and a wetting agent present in an amount of from about 0.5 to about 20 parts by weight per 100 parts by weight of refractory filler, wherein the resin is present in a range of about 5 to about 30 parts by weight per 100 parts by weight of refractory filler.

4,072,532

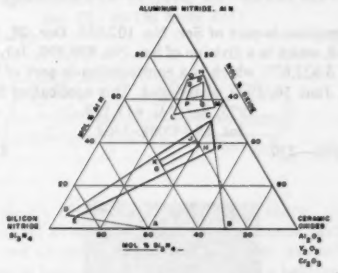
HIGH TEMPERATURE RESISTANT CERMET AND CERAMIC COMPOSITIONS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and Wayne M. Phillips, La Crescenta, Calif.

Filed Nov. 20, 1975, Ser. No. 633,876
Int. Cl.[2] C04B 35/58, 35/70
U.S. Cl. 106—65 18 Claims

1. A high temperature oxidation resistant cermet composition having high strength and abrasion resistance and resistance to thermal shock, comprising a sintered body consisting essentially of high temperature resistant metal particles selected from the group consisting of molybdenum, tungsten, tantalum and niobium particles, dispersed in a solid solution of silicon nitride, aluminum nitride and an oxide selected from the group consisting of aluminum oxide, yttrium oxide and chromium oxide, and mixtures thereof, said cermet composition having good adhesion to substrates of a metal as defined above.

2. A cermet composition having high temperature oxidation resistance, and high abrasion and erosion resistance, high strength and resistance to thermal shock, comprising a sintered body consisting essentially of metal particles selected from the group consisting of molybdenum, tungsten, tantalum and niobium particles, coated with and dispersed in a solid solution of silicon nitride, aluminum nitride and an oxide selected from the group consisting of aluminum oxide, yttrium oxide and chromium oxide, and mixtures thereof, in molar proportions defined by the area bounded by points A, B, C and D on the ternary diagram in the accompanying drawing, said cermet composition having good adhesion to substrates of a metal as defined above.



4,072,533

LIGHTWEIGHT, NON-CEMENTITIOUS BUILDING MATERIAL

Jeffery L. Barrall, and William R. Reed, both of Lancaster, Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Oct. 14, 1976, Ser. No. 732,534
Int. Cl.[2] C04B 35/16
U.S. Cl. 106—84 11 Claims

1. An improved non-cementitious building material comprising sodium silicate and an expanded siliceous inorganic aggregate, the improvement comprising said building material further including an efflorescence inhibitor comprising a boron compound selected from the group consisting of the borates of zinc, calcium, magnesium, and mixtures thereof; a calcium salt selected from the group consisting of calcium nitrate, calcium phosphate, calcium orthophosphate, and mixtures thereof.

4,072,534

SUPER SULPHATE CEMENT REINFORCED WITH GLASS FIBERS

Jack Forrester Ryder, Abbots Langley, England, assignor to National Research Development Corporation, London, England

Filed Dec. 23, 1975, Ser. No. 643,927
Claims priority, application United Kingdom, Dec. 23, 1974, 55453/74
Int. Cl.[2] C04B 7/02
U.S. Cl. 106—98 16 Claims

1. A process for preparing a glass fibre cementitious composite comprising alkali-resistant glass fibres and supersulphate cement which comprises admixing from 0.5 to 10% by weight, based on the glass fibre/wet cement mix, of said alkali-resistant glass fibres in a supersulphate cement matrix, said alkali-resistant glass fibres comprising from 5 to 20% by weight of a material selected from the class consisting of zirconia and stannia and from 60 to 80% by weight of silica.

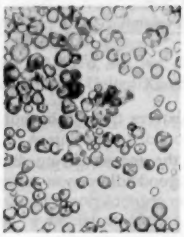
4,072,535
PRECOMPACTED-STARCH BINDER-DISINTEGRANT-FILLER MATERIAL FOR DIRECT COMPRESSION TABLETS AND DRY DOSAGE CAPSULES

Rolland W. P. Short, and Frank Verbanac, both of Decatur, Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.

Continuation-in-part of Ser. No. 102,033, Dec. 28, 1970, abandoned, which is a division of Ser. No. 839,590, July 7, 1969, Pat. No. 3,622,677, which is a continuation-in-part of Ser. No. 646,496, June 16, 1967, abandoned. This application Sept. 26, 1975, Ser. No. 617,133

Int. Cl.[2] C08L *3/02*

U.S. Cl. 106—210 **11 Claims**



1. A directly compressible tabletting vehicle having binder-disintegrant properties consisting essentially of a free-flowing, precompacted-starch powder derived from a cold water insoluble granular starch which has been subjected to physical compaction without supplementary thermal energy to obtain a precompacted-starch powder having birefringent granules, non-birefringent granules and non-birefringent fragments of granules in which some aggregates of birefringent and non-birefringent granules and fragments are present, and having a loose bulk density in the range of from about 0.5 to about 0.7 grams per milliliter, a moisture content in the range of from about 9 to about 16%, total weight basis, said precompacted-starch powder being pulverized and screened to obtain a particle size distribution which is free of +40 mesh particles and at least 90% of said precompacted-starch powder is −80 mesh size, at least about 10% is +270 mesh size, and from about 30% to about 90% is −270 mesh size, on a total weight basis, said precompacted-starch powder having a cold water solubility of from 4% to about 40% by weight, and further characterized as capable of being directly compressed into a carrier tablet containing active ingredients, said tablet having a hardness index of at least about 4 kg., a friability weight loss of less than about 1.0%, a swelling power of 2.5 to about 12, and said tablet being capable of effectively disintegrating when placed in water.

4,072,536
WATER-SOLUBLE COATING COMPOSITIONS AND PROCESS FOR THEIR PREPARATION

Yutaka Otsuki, Yokohama; Yoshihiko Araki, Kawasaki, and Kazuho Aoyama, Tokyo, all of Japan, assignors to Nippon Oil Company, Ltd., Tokyo, Japan

Filed Apr. 14, 1976, Ser. No. 676,886

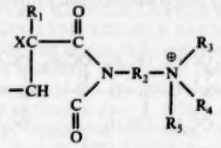
Claims priority, application Japan, Apr. 15, 1975, 50-44802

Int. Cl.[2] C08L *91/08*

U.S. Cl. 106—252 **9 Claims**

1. A coating composition for cathode-precipitating electrodeposition consisting essentially of

(1) a curable resinous film-forming component capable of being rendered water-soluble, said component consisting of an unsaturated organic compound having a molecular weight of 300 to 30,000 containing a carbon-carbon double bond in an amount corrresponding to an iodine number of 50 to 500, said unsaturated organic compound being selected from the group consisting of (a) a homopolymer of a conjugated diolefin containing 4 to 8 carbon atoms, (b) a copolymer of at least two conjugated diolefins containing 4 to 8 carbon atoms, (c) a copolymer of at least one conjugated diolefin containing 4 to 8 carbon atoms and a vinyl monomer having an ethylenic unsaturation containing 2 to 20 carbon atoms, (d) a natural oil, (e) a natural fat and (f) a petroleum resin produced by cationic polymerization of petroleum cracking fractions containing 4 to 10 carbon atoms with a Friedel-Crafts catalyst, said unsaturated organic compound having bonded thereto, through a carbon-carbon bond, organic basic groups of the following formula in aqueous solutions when rendered water-soluble



wherein R_1 is hydrogen, halogen or a hydrocarbon residue containing 1 to 3 carbon atoms, R_2, R_3 and R_4 are identical or different and each represents a hydrocarbon residue containing 1 to 20 carbon atoms, R_5 is hydrogen, and X represents hydrogen or a bond, the amount of said organic basic groups being 0.05 to 0.5 mole per 100 g of the film-forming component, and

(2) an aqueous or organic liquid medium, said film-forming component being rendered water-soluble by neutralization with a water-soluble inorganic or organic acid.

4,072,537
COMPOSITE SILICATE PIGMENT

Frederick L. Kurrle, Laurel, Md., assignor to Westvaco Corporation, New York, N.Y.

Division of Ser. No. 668,436, March 19, 1976, Pat. No. 4,026,721. This application Mar. 2, 1977, Ser. No. 773,749

Int. Cl.[2] C09C *1/28*

U.S. Cl. 106—288 B **5 Claims**

1. A size press formulation suitable for sizing paper or the like comprising an aqueous solution of binder and pigment, the improvement which comprises as the pigment a composite white pigment comprising a clay pigment component having a platelet type structure, said platelets having planar surfaces and a metal silicate pigment component in the form of spherical particles of an alkaine earth metal silicate precipitated on the planar surfaces of the clay platelets, said metal silicate component comprising from about 10–90% by weight of the total composite pigment.

4,072,538
PROCESS FOR THE TWO-STAGE DECOMPOSITION OF HEMI-CELLULOSES TO XYLOSE

Rudolf Fahn, Gammelsdorf; Bernd Brenner, Moosburg, and Hans Buckl, Freising-Tumtenhausen, all of Germany, assignors to Sud-Chemie AG, Munich, Germany

Filed Oct. 4, 1976, Ser. No. 729,058

Claims priority, application Germany, Oct. 8, 1975, 2545110

Int. Cl.[2] C13K *13/00, 1/02;* **C07C** *31/18*

U.S. Cl. 127—37 **19 Claims**

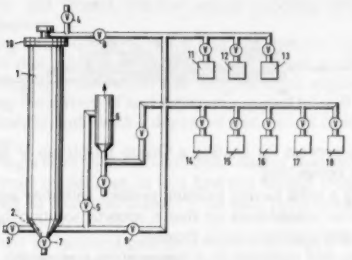
1. In a process for the two-stage decomposition of a hemicellulose of a xylan-containing natural product for the purpose of obtaining xylose wherein the hemi-cellulose of xylan is treated in a first stage with a basic medium and the obtained solid residue is thereafter subjected in a subsequent stage to an acid treatment, the improvement wherein the treatment with said basic medium and said acid are carried out in a single reaction vessel and:

a. in the first stage the hemi-cellulose of xylan-containing material is treated at an atmospheric or elevated pressure

and at an elevated temperature with an alkali hydroxide solution, the alkali content of which is sufficient to split off and neutralize acetic acid bound in the hemi-cellulose of the xylan-containing material, and the resultant alkaline solution is filtered off from the reaction vessel to leave behind the solid residue;

b. following the alkali treatment, the solid residue is extracted within the reaction vessel with at least one liquid surge at a temperature of about 20 to 120° C;

c. in the subsequent stage the so-extracted solid residue is



subjected at an elevated pressure and at an elevated temperature to an acid treatment, the acid treatment being effected employing an acid solution, said acid solution being filtered off following contact with said solid extraction residue from the reaction vessel;

d. the resultant acid treated residue is extracted afresh within the reaction vessel with at least one liquid surge at a temperature of about 20° to 120° C;

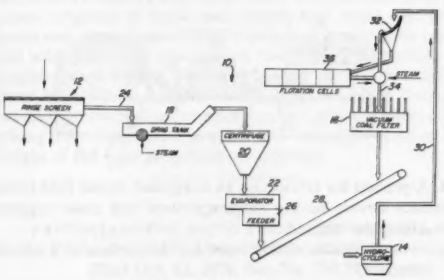
e. the extract obtained from said extraction and the solution obtained from the acid treatment are processed for the recovery of xylose or xylitol.

4,072,539

METHOD OF CLEANING RAW ORE

William Benzon, 613 Bittersweet Road, Center Valley, Pa. 18034

Filed Nov. 22, 1976, Ser. No. 743,553
Int. Cl.[2] B08B *7/04;* **F26B** *1/00, 5/04*
U.S. Cl. 134—25 R **7 Claims**



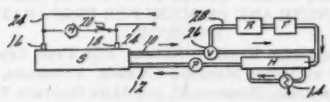
1. A method of cleaning a raw ore product such as coal comprising the steps of heating the ore product by conveying the ore product through a bath of hot water, then removing surface water from the ore product, and then drying the ore product to the desired moisture content by use of an evaporative cooler, said ore product moving through said evaporative cooler in a downward direction while being contacted by moving air traveling in a transverse direction, said air moving at a rate of substantially between 10,000 and 15,000 cubic feet per ton of ore product.

4,072,540

RECHARGEABLE ELECTRICAL ENERGY STORAGE DEVICE

Philip C. Symons, Birmingham, and Carmelo J. Amato, Livonia, both of Mich., assignors to Energy Development Associates, Madison Heights, Mich.

Continuation of Ser. No. 199,966, Nov. 18, 1971, abandoned. This application Feb. 14, 1974, Ser. No. 441,733
Int. Cl.[2] H01M *8/06, 8/18*
U.S. Cl. 429—70 **2 Claims**



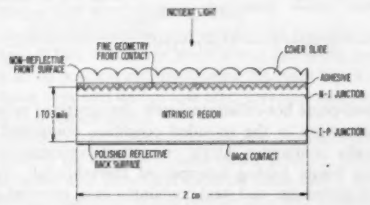
1. In an electrically rechargeable electric energy storage system having (a) an electrode compartment means having an inlet means and an outlet means, said electrode compartment means having at least one cell having a positive halogen electrode and a negative metal electrode, wherein during the charge metal ions from an aqueous metal halide electrolyte are deposited onto the metal electrode and halogen is generated at the halogen electrode from the halide ions in the electrolyte, and during discharge the metal and halogen are converted back to the respective ions; (b) a storage compartment means having an inlet means and an outlet means and adapted to contain a halogen hydrate formed during the charging of the system; (c) a conduit means connecting the electrode compartment means and the storage compartment means, whereby electrolyte circulates between the electrode compartment means and the storage compartment means, the improvement which comprises valve controlled bypass means for said conduit means, said by-pass means having heat transfer means and halogen hydrate formation means serially included therein so as to cool the electrolyte which is circulating between the electrode compartment means and the storage compartment means through said conduit means, the halogen hydrate formation means being adapted to form halogen hydrate from the halogen and cool aqueous metal halide electrolyte solution during charging, said by-pass means being adapted to be disconnected from said conduit means after charging.

4,072,541

RADIATION HARDENED P-I-N AND N-I-P SOLAR CELLS

Andrew Meulenberg, Jr., and John Harvey Reynolds, both of Gaithersburg, Md., assignors to Communications Satellite Corporation, Washington, D.C.

Continuation-in-part of Ser. No. 634,221, Nov. 21, 1975, abandoned. This application Mar. 3, 1977, Ser. No. 774,164
Int. Cl.[2] H01L *31/06*
U.S. Cl. 136—89 SJ **10 Claims**



1. A radiation hardened solar cell comprising a high purity nominally intrinsic silicon substrate having a resistivity exceeding 100 Ω cm and a thickness of less than 10 mils, said substrate having a first region of one conductivity type formed within one surface of the substrate thereby providing a first junction, and a second region of opposite conductivity type formed

within the opposing surface of the substrate thereby providing a second junction, one of said surfaces forming the back surface of the solar cell and being reflective; and other of said surfaces forming the front surface of said solar cell and being non-reflective.

4,072,542

ALLOY SHEET METAL FOR FINS OF HEAT EXCHANGER AND PROCESS FOR PREPARATION THEREOF

Hiroshi Murakado; Kazuhiro Nakata; Eiki Usui; Tetsuo Tamiya, all of Moka; Masahiro Chikuda, Yokohama, Japan; Yoshinobu Kitao, Shimonoseki, and Akira Fujiwara, Kobe, all of Japan, assignors to Kobe Steel, Ltd., Kobe, Japan

Filed June 30, 1976, Ser. No. 701,402

Claims priority, application Japan, July 2, 1975, 50-82128; Sept. 8, 1975, 50-109351; Oct. 3, 1975, 50-119933

Int. Cl.[2] C22D *1/04;* C22C *21/00*

U.S. Cl. 148—11.5 A **11 Claims**

1. A process for the preparation of metal sheets for use in the formation of fins of heat exchangers having tube-penetrating holes formed therein by piercing, burling, ironing and flanging steps, which comprises the steps of:

subjecting an Al slab, comprising at least one member from Ti, Zr, Mo, Cr, V, Hf, Ta, W, Nb, Tc and Re capable of peritectic reaction with Al, the amount of said element incorporated within said slab being 0.05 to 0.4% be weight when one element is incorporated therein, and when two or more elements are incorporated therein, the amount of at least one element incorporated therein is 0.05 to 0.4% by weihgt, and the total amount of said elements being incorporated therein is up to 0.5% by weight, and the Al slab further comprises at least one member selected from the group consisting of up to 0.25% by weight of Cu, up to 0.5% by weight of Mg, up to 0.5% by weight of Mn, up to 0.7% by weight of Fe, up to 0.002% by weight of Be, up to 0.1% by weight of B in the form of TiB_2 and up to 0.7% by weight of Si, to a soaking treatment, hot-rolling said slab, and cold-rolling said hot-rolled slab.

4,072,543

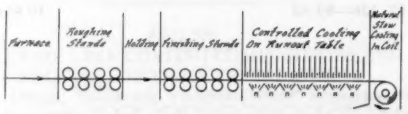
DUAL-PHASE HOT-ROLLED STEEL STRIP

Arthur P. Coldren; Geoffrey Tither, and Douglas V. Doane, all of Ann Arbor, Mich., assignors to Amax Inc., New York, N.Y.

Filed Jan. 24, 1977, Ser. No. 761,952

Int. Cl.[2] C21D *7/14, 9/46*

U.S. Cl. 148—12 F **6 Claims**



1. A dual-phase hot-rolled steel strip characterized as having a microstructure in the as-rolled condition comprised of a substantially continuous matrix comprised predominantly of polygonal ferrite having interspersed therethrough discrete islands of martensite, said steel containing as its essential alloying constituents from about 0.05% to about 0.11% carbon, about 0.6% to about 1.8% manganese, about 0.7% to about 1.2% silicon, about 0.2% to about 0.4% molybdenum, about 0.3% to about 0.9% chromium, up to about 0.1% vanadium, and the balance consisting essentially of iron along with the conventional impurities and residuals present in the usual amounts.

4,072,544

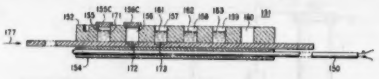
GROWTH OF III-V LAYERS CONTAINING ARSENIC, ANTIMONY AND PHOSPHORUS

John Christian DeWinter, Howell Township, Monmouth County; Robert Edward Nahory, Lincroft, and Martin Alan Pollack, Westfield, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 676,556, April 13, 1976, Pat. No. 4,032,951. This application Mar. 29, 1977, Ser. No. 782,354

Int. Cl.[2] H01L *21/208*

U.S. Cl. 148—171 **7 Claims**



1. In a process for coating a Group III-Group V substrate the steps comprising

heating a solid having gallium, arsenic, antimony and phosphorus constituents so that a growth solution having a solution temperature is formed;

heating said substrate to a temperature comparable to said solution temperature; and

applying said growth solution to said substrate by a liquid phase epitaxial method so that a grown coating results,

said solution including gallium, arsenic, antimony and phosphorus in proportions such that the grown coating is substantially lattice matched to said substrate,

whereby said grown coating is found to be graded in phosphorus content and to have a smooth surface having a lattice constant significantly different from said substrate so that growth of subsequent layers in electronic device manufacture is facilitated.

4,072,545

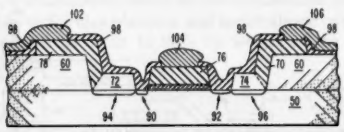
RAISED SOURCE AND DRAIN IGFET DEVICE FABRICATION

Francisco H. De La Moneda, Reston, Va., assignor to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 529,193, Dec. 3, 1974, Pat. No. 4,016,587. This application May 21, 1976, Ser. No. 688,811

Int. Cl.[2] H01L *21/265*

U.S. Cl. 148—187 **8 Claims**



8. A process for fabricating an integrated circuit field effect transistor device having shallow source and drain regions, comprising the steps of:

growing a silicon nitride layer on the surface of a silicon substrate;

etching said silicon nitride layer so as to leave a first silicon nitride region and a second silicon nitride region spaced from said first silicon nitride region on the surface of said substrate;

growing a first thermal oxide layer on the exposed portions of the surface of said silicon substrate so as to form a first thermal oxide region surrounding said first and second silicon nitride regions and a second thermal oxide region between said first and said second silicon nitride regions;

etching said second thermal oxide region so as to expose the surface of said substrate beneath same;

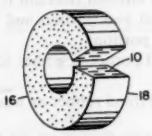
growing a second, thin thermal oxide layer between said first and said second silicon nitride regions;
etching said first and said second silicon nitride regions so as to expose the surface of said silicon wafer thereunder as first and second window regions;
depositing a silicon layer on all exposed surfaces;
said silicon layer forming the polycrystalline silicon phase in those regions over said first thermal oxide layer and said thin thermal oxide layer;
said silicon layer forming a first epitaxial monocrystalline region over said first window region exposing said silicon substrate and a second epitaxial monocrystalline region over said second window region exposing said silicon substrate;
etching a first trough between said first epitaxial region and said thin oxide region and a second trough between said second epitaxial region and said thin oxide region;
doping the surface of said substrate exposed by said first and second troughs with a dopant of said second conductivity type;
growing a third thermal oxide layer thicker than said second thermal oxide layer, in said first and second troughs;
forming an electrical contact with each polycrystalline silicon region;
whereby an insulated gate field effect transistor is formed in a process which decouples the fabrication of the shallow source and drain junctions from their conductivity interconnections.

4,072,546

USE OF GRAPHITE FIBERS TO AUGMENT PROPELLANT BURNING RATE

Richard Winer, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation of Ser. No. 210,654, Dec. 22, 1971, abandoned.
This application Nov. 5, 1975, Ser. No. 628,863
Int. Cl.[2] C06B *45/10*
U.S. Cl. 149—19.8 **12 Claims**



1. A solid propellant composition for use as a solid propellant in rocket motors, said composition being selected from the group consisting of single base, double base, triple base composite and composite modified double base composition types, said solid propellant composition containing a multiplicity of graphite fibers having diameters of from about 4 microns to about 10 microns substantially uniformly distributed throughout said solid propellant composition said graphite fibers comprising from about 0.03% to about 10% by weight based on the weight of the solid propellant composition.

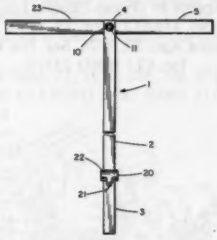
4,072,547

PAPERHANGING HAND TOOL AND METHOD

Joseph F. Pavnica, 311 S. Midland, Joliet, Ill. 60436

Filed Oct. 12, 1976, Ser. No. 731,712
Int. Cl.[2] E04F *13/20*
U.S. Cl. 156—71 **8 Claims**

1. A hand tool for hanging wallpaper, comprising an elongated handle of a preselected length, said handle including hand grasp means extending inwardly from a first end thereof to enable a workman to hold said handle with one hand, clamp means adjacent said hand grasp means to clamp an edge of a roll of wallpaper therein, a crosspiece affixed to the opposite second end of said elongated handle, including a roll of wallpaper draped over said crosspiece having a first fractional length extending along a first side from said crosspiece to said clamp means, the remaining fractional length of said draped over roll of wallpaper extending downwardly from said crosspiece on said opposite second side of said handle and crosspiece,



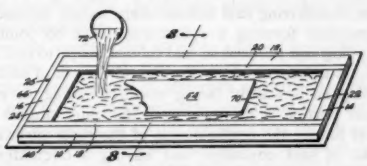
wherein said first fractional length of said roll of wallpaper is any fraction between one-third and one-half of the total length of said roll of wallpaper cut to wall height.

4,072,548

PANEL DOOR AND METHOD OF CONSTRUCTION

Howard S. Gerson, and Bernard Gerson, both of 3802 N.W. 32 Ave., Miami, Fla. 33142

Filed Dec. 27, 1976, Ser. No. 754,559
Int. Cl.[2] B32B *5/20*
U.S. Cl. 156—79 **5 Claims**



1. Method of constructing a panel door comprising the steps of:

a. Constructing a rectangular skeletal frame having outside and inside faces and defining at least one rectangular opening in a central portion thereof, providing a rectangular mold having a design side and sizing said rectangular opening to said mold prior to assembling said skeletal frame as by staples,
b. laminating a sheet of plywood in a covering relation to said outside face,
c. simultaneously routing out a central portion of said plywood sheet and a peripheral edge portion of said rectangular opening to form a simulated molding strip around said rectangular opening,
d. routing out a key groove in said skeletal frame within and around said rectangular opening,
e. placing said mold in said rectangular opening with said outside face in a down position and said mold design side in an up position and distributing foamable liquid polyurethane over said design side after spraying said design side with a release agent,
f. placing a sheet of polyvinyl chloride over said inside face,
g. placing the door in a press under pressure, sandwiched between said polyvinyl chloride sheet and a protective sheet of material on said outside face for a predetermined period of time until said polyurethane expands and hardens,
h. remove said door from said press and said sheets and mold from said door,
i. laminate a sheet of polyvinyl chloride over said inside surface.

4,072,549

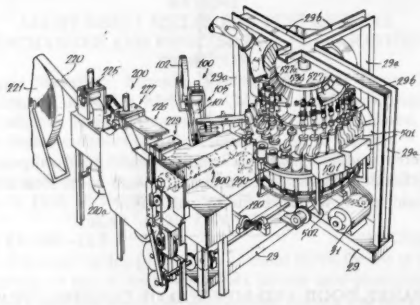
METHOD AND APPARATUS FOR FABRICATING THERMOPLASTIC CONTAINERS

Stephen Amberg, Toledo, Ohio, and Ralph G. Amberg, Monticello, Ind., assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 418,612, Nov. 23, 1973, abandoned. This application Apr. 30, 1976, Ser. No. 681,855

Int. Cl.² B29D *23/10*

U.S. Cl. 156—86 **15 Claims**



1. The method of fabricating a cup-like container comprising the steps of: providing a rectangular blank of heat-shrinkable thermoplastic material; winding said blank about a generally cylindrical wrapping member to provide a tubular shape with a trailing end portion of said blank overlapping a leading end portion; transferring said tubular shape axially on said wrapping member; forming a cylindrical sleeve by joining said overlapping end portions of said tubular shape to one another in a liquid-tight seam extending the full length of said sleeve; providing an upwardly facing mandrel having an enlarged diameter portion at its lower end, the outer surface of said mandrel having the configuration of the inner surface of the sidewall of said container, and having a circumferentially extending concave rimming die portion located at said lower end; heating said mandrel rimming die portion to an elevated temperature; telescoping said cylindrical sleeve over said mandrel; forcing said sleeve axially downwardly about said lower end and into said mandrel rimming die portion to cause a portion of the lower end of the sleeve to be turned upwardly; rotating said mandrel as said sleeve is forced downwardly; advancing a complementary rimming die in juxtaposition with said mandrel rimming die portion during rotation of said mandrel to cause said upwardly turned portion to be directed inwardly to form a curled rim; subsequently exposing the sleeve to heat while it is in position over the mandrel to cause it to shrink so that the inner surface conforms to the outer surface of the mandrel; fusing a bottom closure disc to the end of said shrunken sleeve opposite said rim to form a liquid-tight seal and thus complete said container; and removing said container from said mandrel.

4,072,550

METHOD AND APPARATUS FOR BUILDING A CLOSED TORUS TIRE

Joseph F. Stalter, Jr., Mogadore, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed June 16, 1975, Ser. No. 587,184

Int. Cl.² B29H *17/00*

U.S. Cl. 156—123 R **15 Claims**

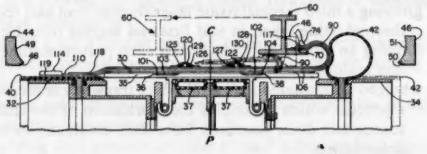
1. A method of manufacturing a closed torus pneumatic tire comprising:

forming a generally cylindrical carcass structure including at least one cord reinforced ply;

positioning a pair of inextensible bead cores coaxially about said cylindrical carcass structure and located in axial directions with respect to the carcass structure substantially in the position they will assume in the completed tire;

forming a first fold in said carcass structure without the aid of any internal restricting devices by radially expanding one axially outer end portion of said carcass structure by bladder means, drawing said one axially outer end portion axially across the central portion of said carcass structure to a predetermined axial position with respect to the bead portions by means of an annular ring having a radially outer annular surface for receiving a rolled-over end of said carcass structure and means for clamping said rolled-over end to said surface to thereby provide for the precise positioning in axial directions of the first fold portion with respect to one said bead core with the fold being free of internal restraint and releasing said one axially outer end portion;

forming a second fold in said carcass structure without the aid of any internal restricting devices by radially expanding one axially outer end portion of said carcass structure by bladder means, drawing said other axially outer end portion axially across the central portion of said carcass structure to a predetermined axial position with respect to the bead portions by means of an annular ring having a radially outer annular surface for receiving a rolled-over end of said carcass structure and means for clamping said rolled-over end to said surface to thereby provide for the precise positioning in axial directions of the second fold portion with respect to the other said bead core with the fold being free of internal restraint to form a lapped portion with said first end portion and releasing said other axially outer end portion;



adhering said lapped portion together to form a closed torus chamber;

providing a belt and tread rubber on said closed torus chamber; and

shaping the chamber to the desired configuration and vulcanizing the tire.

4,072,551

NOVEL DOSAGE FORM

Dennis Joseph Dabai, Whippany, and Joseph James Williams, West Caldwell, both of N.J., assignors to Hoffman-La Roche Inc., Nutley, N.J.

Division of Ser. No. 640,608, Dec. 15, 1975, abandoned. This application Feb. 7, 1977, Ser. No. 766,474

Int. Cl.² A61K *9/70*; B31C *11/06*

U.S. Cl. 156—378 **4 Claims**

1. A system for producing solid, pharmaceutical unit dosage forms comprising, in combination:

(a) first means for producing a web of edible, therapeutically inert material;

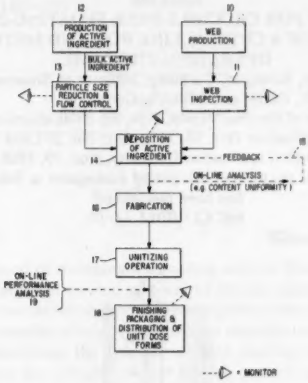
(b) second means receiving said web for loading to said web at least one medicament;

(c) third means receiving said loaded web for fabricating said loaded web into a solid geometric form of predetermined dimensions having said medicament substantially internalized, said form being divisible into a plurality of unit dosage forms, said means including means for cutting said loaded web transversely to form substantially uniform lengths of loaded web each divisible into a plurality of unit dosage forms, means for corrugating each length of web to form it into a loosely wound coil and means for convo-

lute winding said loose coils to form a substantially solid rod;

(d) fourth means receiving said solid rod for cutting said rod transversely to form a plurality of unit dosage forms;

(e) fifth means receiving said unit dosage forms for sealing said unit dosage forms and completely internalizing said medicament; and



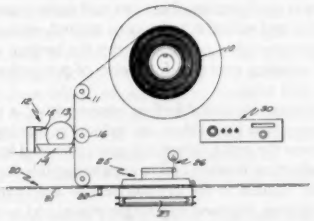
(f) means for testing on-line non-destructively the output of at least one of said first through said fifth means and thereby assure uniform quality of said unit dosage forms, wherein said third means includes means for applying water in predetermined amount to said rod, said means being positioned so that said water is applied only to the trailing edge of said rod and means for removing said water thereby longitudinally sealing said rod.

4,072,552

ULTRAVIOLET BLISTER SEALING MEANS

William D. Ewing, Warren, R.I., assignor to Foxon Packaging Corporation, Providence, R.I.

Filed Nov. 8, 1976, Ser. No. 739,555
Int. Cl.[2] B32B *19/02;* **B65C** *11/04;* **E04B** *1/00*
U.S. Cl. 156—380 **4 Claims**



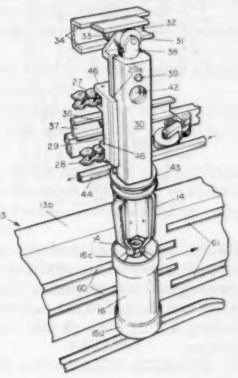
1. A packaging mechanism comprising means for feeding a transparent blister material, means for feeding a backing material, bond means for printing in a pattern ultraviolet curable coating on one of said materials, means for registering said materials, means reciprocating for pressing said materials together and means to expose said bond means to ultraviolet rays during the pressing of said materials together, all of said means operating as the feeding is continuously advanced.

4,072,553

APPARATUS CONTROLLING SHRINKAGE OF A SLEEVE WRAP ON A CONTAINER

Frederick Williams Braker, Toledo; Russell William Heckman, Perrysburg; George Allen Nickey, Toledo, and Terry Clair Potter, Sylvania, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 31, 1976, Ser. No. 672,227
Int. Cl.[2] B29D *3/00;* **B65B** *53/06*
U.S. Cl. 156—423 **9 Claims**



1. An apparatus for shrinking a plastic sleeve wrap on a container comprising

a conveyor operable for travel in a closed horizontal path,

a plurality of spaced apart chucks depending with their vertical axes normal to said path and rotatably mounted on said conveyor for rotation about said axes, each said chuck including an axially rotatable belt driven member, the chucks being moved through a container loading station along said conveyor path and operated responsive to movement through said station for grasping containers and suspending them vertically in an upright position for movement and rotation in said path,

a sleeve assembly station along said conveyor path,

means for axially assembling a sleeve of a heat shrinkable plastic material on each said container responsive to movement through said sleeve assembling station,

an elongated oven along said conveyor path spaced beyond said sleeve assembling station and through which said containers with sleeves are conveyed for shrinking the latter on the former,

a movable driving member comprising and endless belt means

means supporting said belt means along the conveyor path for engaging said rotatable member of the chucks during the span of movement of the containers while in the oven, and including

a variable speed drive means operatively connected to the belt means for running the latter at a predetermined speed in one direction along said oven span, wherein said belt means engages the said rotatable member of each of the moving chucks driving them at a rotary speed of at least 100 RPM.

4,072,554

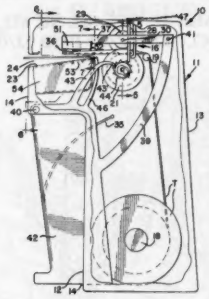
HAND PUNCH AND TAPE REINFORCEMENT APPLICATOR

John D. McKibben, 324 Cottonwood Court, Schaumburg, Ill. 60172

Filed Apr. 5, 1976, Ser. No. 674,045
Int. Cl.[2] B32B *31/00;* **B26D** *7/14;* **B65M** *23/34*
U.S. Cl. 156—514 **9 Claims**

1. A combination paper hole punch and reinforcement tape

applicator comprising a housing, a spindle for supporting a supply of tape, a drive roller supported for rotating movement, a concave peripheral groove in said drive roller for receiving a strip of tape from said supply, a driven roller having a peripheral rib depressing said tape into said groove so as to curl said



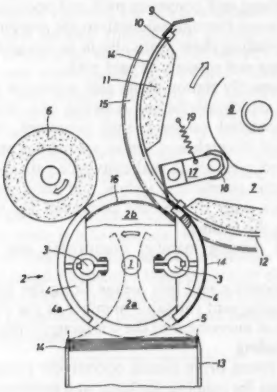
tape across its width, a paper and tape support, a movable tape support arm, a pad assembly for applying said tape to said paper, means moving said tape support arm to create tension in said tape from the end thereof to the support arm, and punch means for punching a hole through said tape and said paper while under tension.

4,072,555

LABEL EXTRACTING AND TRANSFERRING DEVICE

Georg Gau, Obertraubling, Germany, assignor to Hermann Kronseder, Worth, Donau, Germany

Filed Dec. 1, 1975, Ser. No. 636,499
Claims priority, application Germany, Dec. 20, 1974, 2460459
Int. Cl.[2] B65C *9/08*
U.S. Cl. 156—571 **5 Claims**



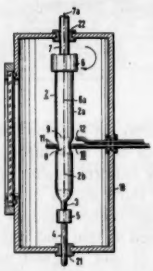
1. In a label extracting and transferring device having a label magazine, a label extracting carrier having arcuately shaped extraction pads, said carrier being rotatably mounted adjacent to said label magazine for extracting labels therefrom, means for coating adhesive over the surfaces of the extraction pads whereby labels extracted thereby from the magazine will stick to the pad surfaces, and a gripper cylinder having arcuately shaped gripper pads, said cylinder being rotatably mounted adjacent to said label extracting carrier for transferring said labels from said carrier to said gripper cylinder, the improvement including means for concurrently rotating said gripper cylinder and label extracting carrier in such manner that the peripheral speed of said label extracting carrier is greater than the peripheral speed of said gripper cylinder, thereby causing the label extracting carrier to tend to overtake the gripper cylinder during mutual rotation thereof, the arcuate surface of the extraction pads diverging from the arcuate surface of the gripper pads to develop a sharp bend in the label to promote peeling it from the adhesive coated surface of the extraction pads as the carriers rotate.

4,072,556

DEVICE FOR CRUCIBLE-FREE FLOATING-ZONE MELTING OF A CRYSTALLINE ROD AND METHOD OF OPERATING THE SAME

Otto Schmidt, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Continuation of Ser. No. 93,649, Nov. 30, 1970, abandoned. This application Oct. 16, 1972, Ser. No. 297,903
Claims priority, application Germany, Nov. 29, 1969, 1960089
The portion of the term of this patent subsequent to Feb. 7, 1993, has been disclaimed.
Int. Cl.[2] B01J *17/10*
U.S. Cl. 156—620 **4 Claims**



1. Method of operating a device for crucible free zone melting a crystalline rod end-supported by holders, one of which is rotatable about the longitudinal axis thereof, the rod being surrounded by an induction heating coil energizable for heating a molten zone formed in the rod, the coil being formed of at least one winding disposed in a single plane and a connecting lead to the coil formed as a partial winding and disposed outside the plane on a side thereof facing a portion of the rod which is to be zone melted which comprises securing in the rotary holder the portion of the crystalline rod to be zone melted, rotating the rotary holder at a speed within the range of from 0.1 to 1 r.p.m. in the direction of winding of the induction heating coil from partial winding through the main winding of the induction heating coil, heating a molten zone in said rod by said induction heating coil, and heating the edge of said molten zone at the boundary between said molten zone and the portion of the rod which is to be zone melted, said edge being heated by said partial winding whereby the heating applied by said partial winding prevents formation of projections of solid material at said edge.

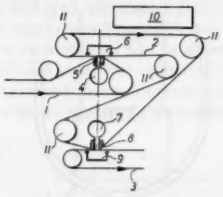
3. In a device for crucible-free zone-melting a crystalline rod, end-supported by holders, an induction heating coil disposed between the end holders and coaxial to said longitudinal axis, said induction heating coil being energizable for heating a molten zone formed in the crystalline rod and comprising at least one winding disposed in a single plane, and a connecting lead to the induction heating coil, said connecting lead being formed as a partial winding and disposed outside said plane on a side thereof facing the portion of the rod which is to be zone melted, the end holder on the same side as the partial winding being mounted for rotation, said partial winding being disposed substantially at the edge of the molten zone at the boundary between said molten zone and the portion of the rod which is to be zone melted, said partial winding thereby preventing formation of projections of solid material at the edge of said molten zone.

4,072,557

METHOD AND APPARATUS FOR SHRINKING A TRAVELLING WEB OF FIBROUS MATERIAL

Christian Schiel, Heidenheim-Schnaitheim, Germany, assignor to J. M. Voith GmbH, Heidenheim (Brenz), Germany

Continuation of Ser. No. 642,371, Dec. 19, 1975, abandoned. This application Feb. 28, 1977, Ser. No. 772,591
Claims priority, application Germany, Dec. 23, 1974, 2461229
Int. Cl.[2] D21H *5/24;* D21F *2/00*
U.S. Cl. 162—111 10 Claims



1. Method of shrinking a travelling web of fibrous material which comprises moving said web of fibrous material disposed on a porous carrier web to an area adjacent a moving transfer web for transfer of said web of fibrous material to said transfer web, maintaining the velocity of said moving transfer web lower than the velocity of said moving porous carrier, maintaining said porous carrier in a convex curvature toward the transfer web in the transfer area, and maintaining a pressure differential between the pressure at the underside of said porous carrier and the topside of said web of fibrous material by gas under pressure in the transfer area acting on the web of fibrous material, said gas under pressure emanating from a fixed position on the side of the carrier web opposite the side carrying the web of fibrous material, to aid in the transfer of said web of fibrous material to said transfer web.

4,072,558

NON-COMBUSTIBLE HARDBOARD SHEET

David Wallace Akerson, St. Paul, Minn., assignor to Conwed Corporation, St. Paul, Minn.

Continuation-in-part of Ser. No. 640,458, Dec. 15, 1975, Pat. No. 4,024,014. This application Feb. 16, 1977, Ser. No. 768,983
The portion of the term of this patent subsequent to May 17, 1994, has been disclaimed.
Int. Cl.[2] D21H *5/18*
U.S. Cl. 162—145 10 Claims

1. A process for producing a hardboard product having a fire rating of Class A according to ASTM Test E-84 comprising:

(a) forming an aqueous slurry of solids and water said solids consisting essentially of the following ingredients:
  (i) from about 60% to about 85% by weight mineral material, said mineral material consisting essentially of:
    (A) from about 20% to about 85% mineral fibers;
    (B) from 0% to about 50% perlite;
    (C) from 0% to about 25% of other mineral materials;
  (ii) from about 15% to about 40% of a binding system, said binding system consisting essentially of:
    (A) from about 5% to about 15% by weight cellulosic fibers;
    (B) from about 10% to about 35% of a heat and moisture re-activatable binding agent;
(b) forming a relatively light product by depositing the said aqueous slurry on a forming screen;
(c) drying the said formed product to a moisture content of no greater than about 3% by weight;
(d) applying to each side of the dried product from about 7 pounds per thousand square feet to about 15 pounds per thousand square feet of water;
(e) simultaneously heating and pressing the formed product to reduce its thickness by a factor of at least 1.5 and to increase its density by a corresponding amount.

10. A process for producing a hardboard product having a fire rating of Class A according to ASTM Test E-84 from a relatively light dry product having the following ingredients:

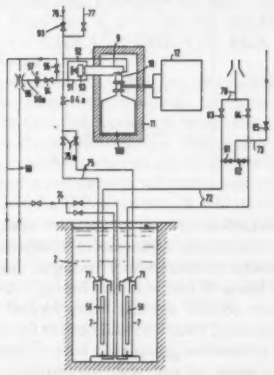
(i) from about 60% to about 85% by weight mineral material, said mineral material being composed of:
  (A) from about 20% to about 85% mineral fibers;
  (B) from 0% to about 50% perlite;
  (C) from 0% to about 25% of other mineral materials;
(ii) from about 15% to about 40% of a binding system, said binding system being composed of:
  (A) from about 5% to about 15% by weight cellulosic fibers;
  (B) from about 10% to about 35% of a heat and moisture re-activatable binding agent;
(iii) said relatively light product having a moisture content of no greater than about 3% by weight; said process comprising:
  (A) applying to the light, dry product from about seven pounds per thousand square feet to about fifteen pounds per thousand square feet of a solution comprising water; and, thereafter,
  (B) simultaneously heating and pressing the formed product to reduce its thickness by a factor of at least 1.5 and to increase its density by a corresponding amount.

4,072,559

METHOD AND APPARATUS FOR THE ZONE-WISE SHUFFLING OF NUCLEAR REACTOR FUEL ELEMENTS

Herbert Neidl; Günther Kaspar, and Rolf Drossel, all of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 416,684, Nov. 16, 1973, abandoned. This application Nov. 25, 1975, Ser. No. 635,379
Claims priority, application Germany, Nov. 30, 1972, 2258722
Int. Cl.[2] G21C *17/06*
U.S. Cl. 176—19 LD 4 Claims



1. A water-cooled reactor installation comprising a reactor pit containing a pressure vessel containing an exposable core of individually removable vertically elongated clad fuel elements, a fuel element storage pit beside said reactor pit and adapted to be water-flooded to a level above said fuel elements when the elements are removed from said core and stored vertically in the storage pit, a fuel element lock interconnecting said pits, a circulating line containing a circulating flow of water, said line circulating water through said storage pit at least up to said level, at least one elongated test chamber vertically positioned in said storage pit and having an open top below said level through which one of said fuel elements can be removably inserted, said test chamber being dimensioned to closely confine any single one of the fuel elements at a time, said test

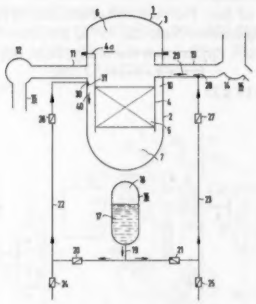
chamber being connected with said circulating flow of water and thereby containing a portion of said water in the form of testing water, a removable air bell closing said open top when said test chamber contains one of said fuel elements and said testing water, controllable means for supplying said air bell with compressed air to form an air cushion holding said testing water stationary in said test chamber for a dwell time causing the water to acquire gamma activity if one of said fuel elements in the test chamber has a cladding defect, means for removing said testing water in the form of a continuous flow of testing water from said test chamber after said dwell time, means for testing said continuous flow of removed testing water for gamma activity and means for returning a thereby tested flow of testing water back to said circulating line.

4,072,560

PRESSURIZED-WATER REACTOR PRESSURE VESSEL EMERGENCY CORE COOLANT CONNECTION ARRANGEMENT

Emmerich Seidelberger, Erlangen, Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Sept. 17, 1975, Ser. No. 614,152
Claims priority, application Germany, Sept. 26, 1974, 2446090
Int. Cl.[2] G21C *9/00*
U.S. Cl. 176—38 **3 Claims**



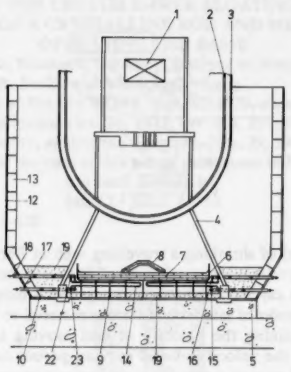
1. A pressurized-water reactor pressure vessel emergency core coolant connection arrangement comprising a pressurized-water reactor pressure vessel having an upstanding wall, a core on the inside of said wall and having a lower edge, an emergency core coolant opening being formed through said wall above said edge, means on said outside for supplying said opening with pressurized emergency core coolant, and nozzle means on the inside of said wall for directing said coolant downwardly substantially parallel with and in contact with said wall in the direction of said edge, a core barrel radially surrounding said core and the barrel forming an annular gap between itself and the inside of the pressure vessel's said wall and the gap having a closed top and an open bottom adjacent to the core's said lower portion, said vessel having a main coolant loop connection with said gap adjacent to the gap's said closed top and said emergency core coolant opening and nozzle means being adjacent to an upper portion of said gap and being separate from said coolant loop connection, said nozzle means being in the form of a cap fixed to the inside of said vessel and covering said emergency core coolant opening, said cap having a closed top and a concave inner surface and a bottom forming a downwardly-directed orifice.

4,072,561

BOTTOM COOLER FOR NUCLEAR REACTORS

Hans-Jurgen Friedrich, Forsbach, Germany, assignor to Interatom, Internationale Atomreaktorbau GmbH, Bensberg, Cologne, Germany

Filed July 28, 1976, Ser. No. 709,306
Claims priority, application Germany, Aug. 11, 1975, 2535729
Int. Cl.[2] G21C *9/00*
U.S. Cl. 176—38 **7 Claims**



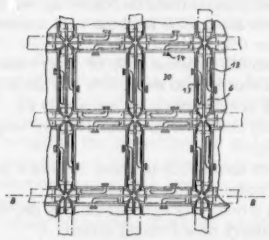
1. In a liquid metal-cooled nuclear reactor having a reactor vessel and a nuclear core received in the reactor vessel, a bottom tray disposed below the reactor vessel wherein the reactor core is received and serving as a receptacle for the reactor core upon melting thereof in the event of a hypothetical accident, and a cooler for the bottom tray comprising: at least one coolant distribution pipe and one collecting pipe disposed below the bottom tray at the circumference thereof, and a multiplicity of hairpin tubes connected in parallel and connecting said distribution and collecting pipes to one another, said tubes extending in radial direction equidistantly from one another and being in the shape of involutes running between the center and circumference of said tray.

4,072,562

DEVICE TO ACCEPT AXIAL FORCES OCCURRING ON FUEL ASSEMBLIES DURING THE OPERATION OF NUCLEAR REACTORS

Melvin F. Sankovich, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Sept. 24, 1976, Ser. No. 726,398
Claims priority, application Germany, Sept. 25, 1975, 2542757
Int. Cl.[2] G21C *3/04*
U.S. Cl. 176—50 **3 Claims**



1. In a nuclear reactor having upper and lower grid plates, protrusions projecting from the upper grid plate, and fuel assemblies with end fittings, wherein the fuel assemblies are positioned between the upper and lower grid plates, an improved arrangement for accepting axial forces comprising: a

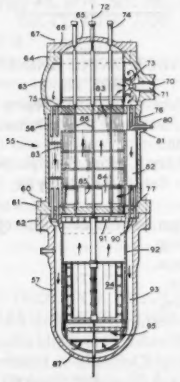
plurality of spring devices, each having a first bending arm, a torsion part, a second bending arm and an upset end; said torsion part fixed at one end to said first bending arm and at its other end to said second bending arm, and said second bending arm terminating in said upset end; each end fitting having a main body, a plurality of compression pieces, and guard plates; said main body having a plurality of grooves of a first type, a plurality of grooves of a second type, and a plurality of slots; each of said spring devices being disposed relative to the end fitting such that said first bending arm is embedded within a groove of said first type, said torsion part rests within a groove of said second type covered partly by one of said guard plates and clamped at its uncovered part by at least one of said compression pieces, said upset end extending through one of said slots; the fuel assembly being disposed such that said second bending arm is biased against the protrusion of the upper grid plate.

4,072,563

INDUSTRIAL TECHNIQUE FOR AN INTEGRAL COMPACT REACTOR

Bertrand N. McDonald, and Donald C. Schluderberg, both of Lynchburg, Va., assignors to The Babcock & Wilcox Company, New York, N.Y.

Filed June 24, 1976, Ser. No. 699,736
Int. Cl.[2] G21C *19/28*
U.S. Cl. 176—65 **5 Claims**



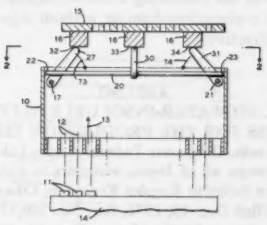
1. An integral nuclear power reactor system comprising a reactor core section that has a longitudinal axis, a heat exchanger section spaced longitudinally from said reactor core section, control rod drive lines passing in a longitudinal direction through said heat exchanger section and into said reactor core section, a pressure vessel having a longitudinal axis that is generally coincident with said reactor core axis, said pressure vessel enclosing said reactor core and attached to said heat exchanger section, an end closure to said heat exchanger section, said reactor core section defining with the inner wall of said pressure vessel an annulus, the integral nuclear reactor system being selectively separable at two longitudinally spaced transverse planes, one of said planes located between said pressure vessel and said heat exchanger section and the other of said transverse planes located between said heat exchanger section and said end closure said end closure having guide tubes attached thereto in order to accommodate said control rod drive lines, and a bundle of generally straight tubes disposed in an annular array within said heat exchanger section establishing fluid communication between said annulus and said end closure.

4,072,564

MOTION RESTRAINING APPARATUS FOR A NUCLEAR REACTOR

Felix S. Jabsen, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed Sept. 24, 1976, Ser. No. 726,397
Int. Cl.[2] G21C *3/30*
U.S. Cl. 176—76 **5 Claims**



1. A motion restraining apparatus for a nuclear reactor that has a fuel element support plate spaced from the reactor core coolant discharge side of the fuel element and in which the fuel element has a plurality of fuel rods with longitudinal axes that are generally parallel to the direction of reactor core coolant flow comprising an end fitting for the coolant discharge side of the fuel element, and torsion bar means mounted within said end fitting to bear against the fuel element support plate and restrain motion of the fuel element in the direction of the core coolant flow.

4,072,565

PRODUCTION OF VIRUSES IN TISSUE CULTURE WITHOUT USE OF SERUM

Stefan Adam Weiss; Harry Lester Torney, both of Carmel, and William Joseph Caldwell, Indianapolis, all of Ind., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 4, 1974, Ser. No. 520,574
Int. Cl.[2] C12B *3/00*; C12K *9/00*; A61K *39/12*
U.S. Cl. 195—1.1 **15 Claims**

1. In a method which comprises inoculating a chemically defined tissue culture medium with living animal cells and incubating the cells and medium in tissure culture until significant cell growth is obtained, and inoculating the cells with virus, the improvement wherein the incubation is carried out in the presence of a cell growth enhancing amount of protamine zinc insulin U.S.P., B.P. dispersed in said medium; removing the medium containing protamine zinc insulin after significant cell growth is obtained from the cells; replacing said medium with a tissue culture maintenance medium essentially free of protamine zinc insulin; prior to virus innoculation and continuing incubation of the cells in tissue culture.

4,072,566

IMMOBILIZED BIOLOGICALLY ACTIVE PROTEINS

Merrill Lynn, Big Flats, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Sept. 27, 1976, Ser. No. 726,592
Int. Cl.[2] C07G *7/02*
U.S. Cl. 195—63 **6 Claims**

1. A method of bonding a biologically active protein to an inorganic support material, the method comprising the steps of:

a. reacting a high surface area, water insoluble, inorganic support material having a surface isoelectric point less than 7.0 with a solution of p-phenylenediamine under conditions sufficient to adsorb at least a portion of the p-phenylenediamine to the surface of the support via one of the amino groups on the p-phenylenediamine, the support material having been selected from the group consist-

ing of siliceous materials, stannic oxide, titania, manganese dioxide, and zirconia;

b. separating the support material from the solution and washing it to remove substantially all non-adsorbed p-phenylenediamine; and

c. reacting the separated support material with a solution of biologically active proteins under conditions sufficient to covalently bond at least a portion of the proteins to the support via the remaining available amino groups of the adsorbed p-phenylenediamine without significant loss of biological activity.

4,072,567

COMPOUND WATER-INSOLUBLE GLUCAN AND PROCESS FOR THE PRODUCTION THEREOF

Koji Yokobayashi, Okayama; Tadashi Ikeda, Tokyo, and Akira Misaki, Hyoogo, all of Japan, assignors to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, Okayama, Japan

Filed Dec. 10, 1976, Ser. No. 749,520

Claims priority, application Japan, Dec. 11, 1975, 50-147854

Int. Cl.[2] C12D *13/04;* C07G *3/00;* C08B *37/00*

U.S. Cl. 195—63 3 Claims

1. A water-insoluble glucan composed of non-reducing terminal residues, alpha-(1→3)-linkage residues, alpha-(1→6)-linkage residues, alpha-(1→4)-linkage residues and alpha-(1→3)- and alpha-(1→6)-branched linkage residues in the ratio of 2:4:3:1:2.

2. A process for the production of a water-insoluble glucan including alpha-(1→3), (1→4) and (1→6) glucosidic linkages, comprising cultivating *Streptococcus salivarius* TTL-LP$_1$ FERM-P No. 3310 on a sucroce-containing medium to form the water-insoluble glucan, and separating and recovering the glucan from the resulting culture broth.

3. A process for the production of water-insoluble glucan including alpha(1→3), (1→4) and (1→6) glucosidic linkages, comprising cultivating *Streptocuccus salivarius* TTL-LP$_1$ FERM-P No. 3310 on a sucrose-containing medium to form the water-insoluble glucan, allowing the water-insoluble glucan to contact an aqueous sucrose solution to effect reaction of the mixture and to form more of the water-insoluble glucan, and separating and recovering the water-insoluble glucan from the reaction mixture.

4,072,568

METHOD FOR THE PREPARATION OF CHOLESTEROL OXIDASE

Prakash S. Masurekar, Webster, and Charles T. Goodhue, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 629,955, Nov. 7, 1975, Pat. No. 4,035,237.

This application Nov. 5, 1976, Ser. No. 739,379

Int. Cl.[2] C12D *13/10*

U.S. Cl. 195—65 2 Claims

1. In a method for the production of cholesterol oxidase by growing a cholesterol oxidase producing micro-organism in a medium comprising a cholesterol oxidase inducer, the improvement wherein said cholesterol oxidase inducer is β-sitosterol.

4,072,569

PREPARATION OF CLAVULANIC USING *STREPTOMYCES JUMONJINENSIS*

Stephen John Box, Roffey, England, assignor to Beecham Group Limited, United Kingdom

Filed Sept. 24, 1976, Ser. No. 726,135

Claims priority, application United Kingdom, Oct. 29, 1975, 41898/75

Int. Cl.[2] C12D *9/14*

U.S. Cl. 195—80 R 20 Claims

1. A process for the preparation of clavulanic acid or a salt thereof which process comprises cultivating a strain of Streptomyces jumonjinensis and isolating clavulanic acid or a salt thereof from the culture.

20. A process for the preparation of clavulanic acid or a salt thereof, which process comprises cultivating Streptomyces jumonjinensis NRRL 5741 or a high yielding mutant thereof, and isolating clavulanic acid or a salt thereof from the culture.

4,072,570

PREPARATION OF A TUBERCULOSIS TEST MEDIUM BY RECONSTITUTING A STORAGE STABILIZED DRY POWDERED LOWENSTEIN-JENSEN MEDIUM

Wilmore Williams, Chicago, Ill., assignor to Beatrice Foods Co., Chicago, Ill.

Continuation of Ser. No. 243,078, April 11, 1972, abandoned.

This application Feb. 20, 1976, Ser. No. 659,703

Int. Cl.[2] B01D *1/16*

U.S. Cl. 195—100 4 Claims

1. A method for producing a tuberculoses test medium from a reconstituted dry powdered, storage stabilized Lowenstein-Jensen medium comprising preparing a Lowenstein-Jensen medium which inclvdes fresh whole eggs, nutrient salts and stabilizers, spray drying the medium in a spray dryer at an inlet temperature of between 230° F and 280° F and an outlet temperature of between 160° F and 190° F and under dryer conditions consistent with providing the dried powder with a moisture content of less than 9% by weight, recovering and packaging the dried powder, storing the packaged powder under ambient conditions, forming a reconstituted medium having a solids content of between 10–20% by weight from said powder, and inspissating said reconstituted medium to provide a medium used in testing for tuberculoses.

4,072,571

KLEBSIELLA PNEUMONIAE AND ENTEROBACTER BROTH

Sandra F. Gibson, Chesterfield, and Gregory D. Rodgers, Florissant, both of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed May 3, 1976, Ser. No. 682,659

Int. Cl.[2] C12K *1/06*

U.S. Cl. 195—100 8 Claims

1. A broth medium for the detection of Klebsiella or Enterobacter comprising:

a. a nitrogen source,

b. a carbon source,

c. a vitamin source,

d. a mixture of chemical inhibitors which will inhibit the growth of Escherichia Coli while simultaneously promoting the growth of Klebsiella or Enterobacter, said E. coli inhibitors being 3-(α-acetonylbenzyl) -4-hydroxycoumarin and 2,4 dinitrophenyl hydrazone of α-Ketoglutaric acid and

e. an indicator to indicate the presence of Klebsiella or Enterobacter, at a pH of about 8.

6. A broth medium for the detection of Klebsiella or Enterobacter comprising a nitrogen source, a carbon source, a vitamin source, Escherichia Coli inhibitors, and an indicator to indicate the present of Klebsiella or Enterobacter, at a pH of 8.0, comprising a mixture of sodium desoxycholate and the sodium salt of ricinoleic acid.

4,072,572

E. COLI DETECTION BROTH FOR CLINICAL USE WITH AUTOMATED MICROBIAL ANALYZER

James W. Lanham, St. Louis; Gregory D. Rodgers, Florissant, both of Mo., and Michael C. Meyer, O'Fallon, Ill., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed May 3, 1976, Ser. No. 682,651

Int. Cl.[2] C12K *1/06*

U.S. Cl. 195—100 8 Claims

1. A composition for selectively identifying *E. coli* comprising:

a. a source of nutrients,
b. an indicator to show the presence of *E. coli* organism and,
c. means for inhibiting the growth of other coliform-like organisms which normally give positive results in tests for *E. coli* comprising a combination of coumaric acid, 3,4-dihydroxybenzoic acid, and saponin.

4,072,573

PSEUDOMONAS AERUGINOSA BROTH

Clifton Aldridge, Maryland Heights; Sandra F. Gibson, Chesterfield, and Gregory D. Rodgers, Florissant, all of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed May 3, 1976, Ser. No. 682,653
Int. Cl.² C12K *1/06*
U.S. Cl. 195—100 **12 Claims**

1. A broth medium for detection of *Pseudomonas aeruginosa* comprising:
a. a nutrient source,
b. a nitrate salt to assist in growth of Pseudomonas and pigment production in the condition of limited O_2, and
c. cetyl trimethylammonium bromide to inhibit gram-negative organisms.

4,072,574

SYSTEM FOR IN VITRO ASSAY FOR MUTAGENICITY AND/OR CARCINOGENICITY OF CHEMICALS OR OTHER EXOGENOUS AGENTS

Lawrence A. Loeb, Elkins Park, and Michael A. Sirover, Philadelphia, both of Pa., assignors to The Institute for Cancer Research, Fox Chase, Pa.

Filed July 30, 1976, Ser. No. 710,314
Int. Cl.² C12K *1/00*
U.S. Cl. 195—103.5 R **9 Claims**

1. The method of testing in vitro for the likelihood of mutagenic or carcinogenic properties in a given substance which comprises copying polynucleotides of known composition in the presence of the substance by means of DNA polymerases in a solution which also contains correct complementary nucleotides for said polynucleotides and non-complementary nucleotides for said polynucleotides, and also doing the same incorrect copying in the absence of the substance, and measuring the relative accuracy of the respective copying.

4,072,575

BROTH AND METHOD FOR DETECTING *E. COLI* IN MIXED WATER SAMPLES

James W. Lanham, St. Louis; Ralph A. Wilkinson, Florissant, and Victorin A. Dagy, St. Louis, all of Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed May 3, 1976, Ser. No. 682,253
Int. Cl.² C12K *1/04*
U.S. Cl. 195—103.5 M **8 Claims**

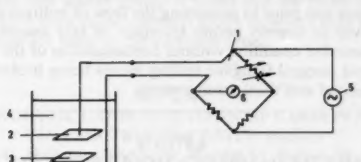
6. A method of selectively identifying *E. coli* organism comprising the steps of:
a. inoculating a specimen containing an unknown organism into a medium which comprises,
a. a source of nutrients,
b. an indicator to visually show the acid produced by metabolic activity of *E. coli* organism,
c. an inhibitor comprised of a combination of acetazolamide and paracoumaric acid to inhibit the growth of other coliform-like organisms which normally give positive results in tests for *E. coli*, and
d. an enhancer to stimulate activity of damaged E. coli organisms,
b. incubating the inoculated medium at about 35° to about 38° C for about 4 to about 6 hours,
c. further incubating the inoculated medium at about 44° to about 56° C for about 10 to about 12 hours,
d. observing the presence of *E. coli* organisms by change in the color of the medium.

4,072,576

METHOD FOR STUDYING ENZYMATIC AND OTHER BIOCHEMICAL REACTIONS

Hans Rune Arwin, V. Frolunda, and Kurt Ingemar Lundstrom, Goteborg, both of Sweden, assignors to AB Kabi, Stockholm, Sweden

Filed Sept. 20, 1976, Ser. No. 724,873
Claims priority, application Sweden, Oct. 6, 1975, 7511148
Int. Cl.² G01N *31/14, 33/16*
U.S. Cl. 195—103.5 R **16 Claims**



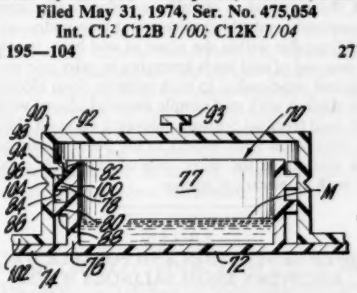
1. Method for determining the activity of concentration in a sample, of a biochemical substance which biochemically affects a substrate that is specific for the biochemical substance which comprises:
providing metallic or semiconductor electrodes coated with said substrate,
determining as a control value, the capacitance in a measuring device of said metallic electrodes or semiconductor electrodes coated with said substrate,
introducing the sample to be tested for the determination of the activity or concentration of said substance into said measuring device so as to contact said coated electrodes with said sample,
measuring the change in capacitance due to a change in the amount of biochemically uneffected substrate coated on said electrodes, and thereby obtaining a quantitative measure of the activity or concentration of said substance, present in the sample and affecting the specific substrate on the electrodes.

4,072,577

METHOD AND MINIATURIZED APPARATUS FOR CULTIVATING BACTERIA

Yashar Hirshaut, Lawrence, N.Y., assignor to Samson Helfgott, Far Rockaway and Jack W. Benjamin, Rosedale, both of, N.Y.

Filed May 31, 1974, Ser. No. 475,054
Int. Cl.² C12B *1/00*; C12K *1/04*
U.S. Cl. 195—104 **27 Claims**



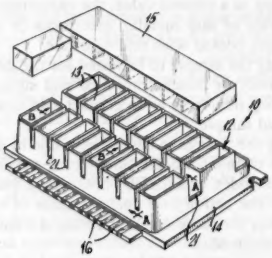
1. An autoclavable, miniaturized microbiological assembly that is readily transportable both before and after innoculation, said assembly comprising:
a. a dish having a least one well therein;
b. a pre-packaged, sterile culture medium contained within said well;
c. removable cover means mounted on said well;
d. cooperating portions on said dish and on said cover means for defining three separate and distinct physical arrangements of said dish and said cover means with respect to

each other, said cooperating portions including integral frangible sealing means for sealing securely said cover means to said dish to define said first arrangement whereby said well is closed and said medium is maintained in a sterile condition prior to the introduction of the bacteria, said second arrangement being such that subsequent contamination of the medium after introduction of bacteria thereto is prevented while only an indirect flow of air to the medium and the bacteria is permitted; and said third arrangement being such that said cover means is temporarily coupled to said dish after introduction of the bacteria and prior to permitting the flow of indirect air thereover to thereby permit transport of said assembly in an unsealed condition without contamination of the medium said integral frangible sealing means being broken in said second and third arrangements.

4,072,578
MULTI-CHAMBERED MODULE FOR USE IN MONITORING GROWTH OF MICROORGANISMS

Paxton Cady; Takeshi Omura; Melvin Rudin, all of Los Altos, and James H. Fleming, Palo Alto, all of Calif., assignors to Bactomatic Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 633,213, Nov. 19, 1975. This application Apr. 22, 1976, Ser. No. 679,385
Int. Cl.[2] C12K *1/04*
U.S. Cl. 195—127 **14 Claims**



1. A multi-chambered module for use in monitoring growth of microorganisms in nutrient media comprising: an electrically non-conductive base; a plurality of chambers lying supported on one surface of and permanently attached to said base, each chamber having access means for placing sample material therein; and a plurality of electrically conductive leads completely embedded within said base under said chambers and lying flat within the plane of said base, terminal portions at one end of said leads emerging in pairs into said chamber in spaced relationship to each other to form electrodes for galvanic contact with said sample material placed within each chamber, said terminal portions emerging into said chambers in angular disposition with respect to the plane of said base, and terminal portions at the other ends of said leads exposed for contact with an electrical source.

4,072,579
POWER GENERATION AND POTABLE WATER RECOVERY FROM SALINOUS WATER

Don B. Carson, Mt. Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Nov. 22, 1976, Ser. No. 744,063
Int. Cl.[2] B01D *3/06*
U.S. Cl. 203—11 **10 Claims**

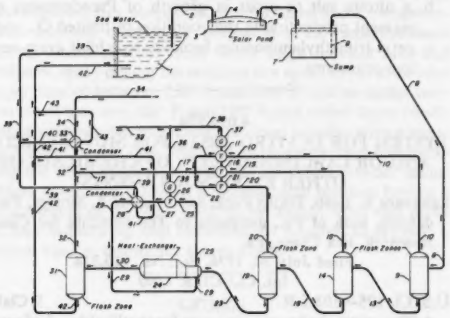
1. A process for the simultaneous generation of power and the recovery of potable water from a source of salinous water which comprises the sequential steps of:

a. introducing a first salinous water portion, obtained from a first depth proximate to the surface of said source, into a solar radiation heat sink;

b. exposing said first salinous water portion, within said solar radiation heat sink, to radiant solar energy for a time sufficient to raise the temperature thereof to a level of at least about 135° F.;

c. introducing the thus-heated salinous water into a plurality of vacuum flash separation zones, each succeeding one of which is maintained at a lower subatmospheric pressure than the preceding zone, (i) to produce substantially non-salinous vaporous phases equal in number to the number of flash separation zones and, (ii) wherein the salinous liquid phase is introduced in series through the plurality of zones;

d. passing each of said non-salinous vapor phases through a separate turbine and (i) condensing the exit vapors via indirect heat-exchange with a second salinous water portion, obtained from a second depth substantially below the surface of said source, to recover liquid potable water, and, (ii) generating power from the resulting motion of said turbines;



e. vaporizing a hydrocarbon, via indirect heat-exchange with the salinous liquid phase emanating from the last flash zone in said plurality, and (i) passing the resulting vaporized hydrocarbon through a turbine, (ii) condensing the exit hydrocarbon vapors, via indirect heat-exchange with said second salinous water portion and, (iii) re-vaporizing the resulting condensed hydrocarbon;

f. generating additional power from the turbine through which said hydrocarbon vapors are passed;

g. introducing said salinous liquid phase, following heat-exchange with said hydrocarbon and at a temperature of at least about 90° F., into a separate vacuum flash zone, maintained at an absolute pressure less than that of the last vacuum flash zone in said plurality; and,

h. condensing the resulting non-salinous vaporous phase, via indirect heat-exchange with said second salinous water portion, and recovering additional liquid potable water.

4,072,580
PROCESS FOR RECOVERING WATER-MISCIBLE SOLVENTS

Helmut Spörk, Altotting; Rudolf Strasser, and Johann Waas, both of Burghausen, all of Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

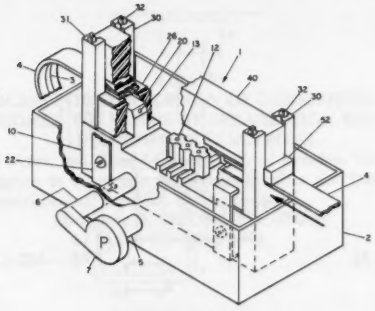
Filed Jan. 26, 1976, Ser. No. 652,009
Claims priority, application Germany, Jan. 29, 1975, 2503619
Int. Cl.[2] B01D *3/00, 3/40, 3/34*
U.S. Cl. 203—47 **7 Claims**

1. A process for removing organopolysiloxane resins from a mixture containing water, a water-miscible organic solvent having a boiling point below that of water and an organopolysiloxane resin which comprises adding an inert organic compound which is a non-solvent for the organopolysiloxane resins and is immiscible with water and has a vapor pressure up to 5 mm Hg (abs.) at 100° C. to the mixture, distilling off the water-miscible organic solvent and thereafter separating the organopolysiloxane resins from the organic compound.

4,072,581
STRIPE ON STRIP PLATING METHOD

Robert M. Allen, Mill Valley, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Division of Ser. No. 619,952, Oct. 6, 1975, Pat. No. 4,030,999. This application Mar. 11, 1977, Ser. No. 776,807
Int. Cl.[2] C25D *5/02, 7/06, 5/08*
U.S. Cl. 204—15 3 Claims



1. A method of plating a stripe of a first material on a strip of a second material comprising the steps of:

transporting said strip continuously over a void having a predetermined length and width while maintaining a fluid-tight seal between said strip and the edges of said void;

jetting a fluid containing said first material substantially perpendicular to said strip face against said strip along a central portion in said void for a predetermined length thereof; and

jetting a fluid containing said first material inwardly in said void from positions at opposite ends of said predetermined length for preventing the escape of spent fluid from said void.

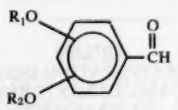
4,072,582
AQUEOUS ACID PLATING BATH AND ADDITIVES FOR PRODUCING BRIGHT ELECTRODEPOSITS OF TIN

William E. Rosenberg, Strongsville, Ohio, assignor to Columbia Chemical Corporation, Cleveland, Ohio

Filed Dec. 27, 1976, Ser. No. 754,177
Int. Cl.[2] C25D *3/32*
U.S. Cl. 204—54 R 28 Claims

1. A primary tin electroplating brightener additive, comprising;

a dialkoxy benzaldehyde having the general formula:



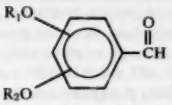
where R_1 and R_2 are methyl, ethyl, propyl or isopropyl, and where one alkoxy group is ortho and the other alkoxy group is meta to the carbonyl group or where both alkoxy groups are meta to the carbonyl group, and

from about 1 to about 97 percent by weight of at least one compound selected from the class consisting of alpha, beta unsaturated carboxylic acids, amides, and esters for producing bright electrodeposits of tin from an aqueous acid plating bath.

15. An aqueous acid electroplating bath containing stannous ions and sulfuric acid for producing bright electrodeposits of tin, comprising;

from about 0.005 to about 0.2 grams/liter of a dialkoxy benzaldehyde brightener dissolved in the bath,

said brightener having the general formula:



where R_1 and R_2 is methyl, ethyl, propyl, or isopropyl, and where one alkoxy group is ortho and the other alkoxy group is meta to the carbonyl group or where both alkoxy groups are meta to the carbonyl group.

4,072,583
ELECTROLYTIC CARBOXYLATION OF CARBON ACIDS VIA ELECTROGENERATED BASES

Richard C. Hallcher, Bridgeton; Manuel M. Baizer, St. Louis, and Donald A. White, Creve Coeur, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Oct. 7, 1976, Ser. No. 730,553
Int. Cl.[2] C25B *3/00, 3/10*
U.S. Cl. 204—59 R 38 Claims

1. A process for electrolytic carboxylation of carbon acids via electrogenerated bases, which process comprises subjecting an anhydrous aprotic liquid electrolysis medium comprising such carbon acid, a base precursor more easily electroreducible than either the carbon acid or carbon dioxide, anhydrous aprotic solvent, added carbon dioxide, and supporting electrolyte to electrolysis at a cathode potential sufficiently negative to effect electro-reduction of the base precursor to the corresponding electrogenerated base but insufficiently negative to effect electro-reduction of either the carbon acid, added carbon dioxide, anhydrous aprotic solvent, or supporting electrolyte of the electrolysis medium, and thereafter recovering a carboxylated carbon acid.

4,072,584
ELECTROCHEMICAL PRODUCTION OF ORGANIC THIOLS

Divna Cipris, Morristown, N.J., and Dirk Pouli, Williamsville, N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Dec. 21, 1976, Ser. No. 753,051
Int. Cl.[2] C25B *3/04*
U.S. Cl. 204—73 R 15 Claims

1. A process for the electrochemical reduction of an organic disulfide, free from other reducible groups in the process, to the corresponding thiol in the presence of halide ion which comprises passing a direct electric current between (1) a stable solid cathode selected from the group consisting of the disulfides and diselenides of titanium, vanadium, molybdenum, tantalum, tungsten, niobium and zirconium, immersed in a catholyte containing the organic disulfide and halide ion, and (2) an anode immersed in an anolyte, wherein the anolyte and catholyte are separated by a membrane.

4,072,585
VALVE METAL ELECTRODE WITH VALVE METAL OXIDE SEMI-CONDUCTIVE COATING HAVING A CHLORINE DISCHARGE CATALYST IN SAID COATING

Giuseppe Bianchi, Milan, Italy; Vittorio de Nora, Nassau, Bahamas; Patrizio Gallone, and Antonio Nidola, both of Milan, Italy, assignors to Diamond Shamrock Technologies S.A., Geneva, Switzerland

Division of Ser. No. 508,232, Sept. 23, 1974, Pat. No. 4,003,817, which is a continuation-in-part of Ser. No. 690,407, Dec. 14, 1967, Pat. No. 3,616,445, and Ser. No. 771,665, Oct. 29, 1968. This application Oct. 5, 1976, Ser. No. 729,688
Int. Cl.[2] C25B *1/46, 11/08, 11/10, 11/06*
U.S. Cl. 204—98 22 Claims

1. The method of effecting an electrolysis process in which

an electrolysis current is passed through a halogen-containing electrolyte between an anode and a cathode and a halogen is released at the anode, which comprises passing the current through a valve metal base from the group consisting of titanium and tantalum, through an electrically conducting electrocatalytic coating on said valve metal base containing an electrocatalytic agent from the group consisting of rhenium, iron, manganese, zinc and the platinum group metals and up to 50% tin, said coating being in the form of oxides of said metals and said percentages being based upon the weight of the metals in said coating, and through the electrolyte to the cathode.

4,072,586
MANGANESE DIOXIDE ELECTRODES

Oronzio De Nora; Antonio Nidola, and Placido M. Spaziante, all of Milan, Italy, assignors to Diamond Shamrock Technologies S.A., Geneva, Switzerland

Filed Apr. 28, 1976, Ser. No. 681,280
Claims priority, application Italy, Dec. 17, 1975, 30142/75
Int. Cl.[2] C25C *7/02, 1/08, 1/12, 1/16*
U.S. Cl. 204—105 M **12 Claims**

1. An electrode consisting essentially of a valve metal base or a base of other electrically-conductive material which is corrosion-resistant to the anodic conditions, having on at least a portion of its outer surface an electrocatalytic coating of β-manganese dioxide chemideposited by thermal decomposition of an alcoholic solution of manganese nitrate, the said β-manganese dioxide coating contains 0.5 to 5% by weight of at least one metal selected from the group consisting of metals of groups IB, IIB, IVA, VA, VB, VIB, VIIB and VIII of the Periodic Table excluding the platinum metals, gold and silver.

10. In an improved method of electrowinning metals from aqueous solutions thereof by passing an electrolysis current through an anode, an aqueous electrolyte containing the metal to be electrowon and a cathode, the improvement comprising using as the anode an electrode of claim 1.

4,072,587
SEPARATE RECOVERY OF SILVER AND GOLD FROM CYANIDE SOLUTIONS

Harold J. Heinen; David G. Peterson, and Roald E. Lindstrom, all of Reno, Nev., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Continuation-in-part of Ser. No. 718,228, Aug. 27, 1976, abandoned. This application Apr. 21, 1977, Ser. No. 789,599
Int. Cl.[2] C01B *1/00*
U.S. Cl. 204—110 **2 Claims**

1. A process for selective recovery of silver and gold from cyanide solutions containing both metals comprising (1) adding to the solution about 0.1 to 2.2 pound CaO per ton of solution, (2) treating the resulting solution with sodium sulfide in an amount of about 110 to 150 percent of the stoichiometric amount to precipitate the silver as silver sulfide, (3) filtering to remove the precipitated silver sulfide, and (4) electrolyzing the filtrate to deposit the gold at the cathode.

4,072,588
METHOD FOR THE ANODIC POLISHING OF SURFACES OF INTERMETALLIC NIOBIUM COMPOUNDS AND NIOBIUM ALLOYS

Heinrich Diepers, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

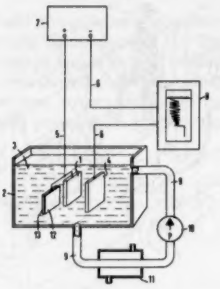
Filed Feb. 15, 1977, Ser. No. 768,829
Claims priority, application Germany, Mar. 8, 1976, 2609549
Int. Cl.[2] C25F *3/26, 7/00*
U.S. Cl. 204—129.43 **4 Claims**

1. A method for the anodic polishing of surfaces of intermetallic niobium compounds and niobium alloys comprising:

a. placing a niobium part as an anode and a cathode, in an electrolyte consisting of 86 to 93% by weight H_2SO_4, 1.5 to 4% by weight HF and 5.5 to 10.0% by weight H_2O with a temperature of between 15° and 50° C;

b. electrically shunting the surface to be polished across the niobium part;

c. adjusting a constant voltage of between 9 and 15 V between the niobium part and the cathode in such a manner that damped current oscillations are superimposed on the electrolyte current;



d. switching off the voltage at the latest after the current oscillations have decayed completely, and keeping it off until the oxide layer built up during the current oscillations is dissolved;

e. subsequently again adjusting a constant voltage between 9 and 15 V so that damped current oscillations occur; and,

f. repeating the sequence of states with the voltage switched on and off several more times.

4,072,589
PROCESS FOR ELECTROLYTIC GRAINING OF ALUMINUM SHEET

Eugene Golda, Monsey; Jen-chi Huang, Yonkers; Ken-ichi Shimazu, Pleasantville, and Simon Long Chu, Dobbs Ferry, all of N.Y., assignors to Polychrome Corporation, Yonkers, N.Y.

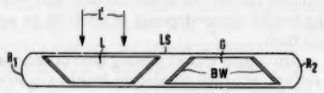
Filed Apr. 13, 1977, Ser. No. 787,192
Int. Cl.[2] C25F *3/04, 5/00*
U.S. Cl. 204—129.4 **6 Claims**

1. A method for electrolytically graining aluminum which comprises immersing the aluminum in an aqueous electrolytic solution containing in combination, one part by weight of hydrochloric acid and from four to six parts by weight of nitric acid as electrolytes, applying thereto an alternating electric current of from 150 to 300 amp. minutes per square foot and maintaining the electrolytic solution at a temperature of 40° C. or above.

4,072,590
METHOD FOR SEPARATING ISOTOPES FROM GASEOUS MIXTURES

Hans-Joachim Niemann; Eberhard Schuster, and Arno Kersting, all of Erlangen, Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed May 15, 1975, Ser. No. 577,897
Claims priority, application Germany, May 20, 1974, 2424728
Int. Cl.[2] B01J *1/10*
U.S. Cl. 204—157.1 R **2 Claims**



1. A method for chemically separating isotopes from a gase-

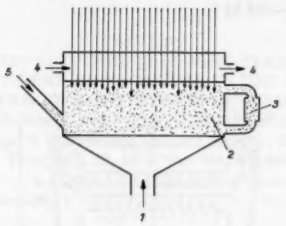
ous mixture containing isotopes and a chemical reaction partner, by a reaction directed by a laser beam having a narrow band of wave lengths molecularly exciting mainly the isotope to be separated and thereby promoting its reaction with the reaction partner; wherein the improvement comprises holding said mixture inside of a laser resonator cavity chamber and forming a resonating wave within the cavity chamber passing through the mixture.

4,072,591

PROCESS FOR CONVERSION OF OLIGOMERS AND HIGHER POLYMERS BY IRRADIATION WITH HIGH-ENERGY ELECTRONS

Armin Ferse, and Harald Grimm, both of Dresden, Germany, assignors to Akademie der Wissenschaften der Deutschen Demokratischen Republik, Berlin, Germany

Filed Sept. 3, 1975, Ser. No. 609,969
Int. Cl.[2] B01J *1/10*
U.S. Cl. 204—159.2 **16 Claims**



1. A process for the production of a fluorine-containing compound of lower molecular weight from a solid polymer of a perfluoroolefin which comprises irradiating with a beam of high-energy electrons at a temperature of between substantially 120–300° C a dispersion of particles of the said solid perfluoroolefin polymer distributed in a perfluoroolefin polymer which is liquid at the reaction temperature and having a lower average molecular weight than the solid perfluoroolefin polymer while a gas that is inert to or reactive with the perfluoroolefin polymers is passed upwardly therethrough so that reactions occur only in the uppermost portions of the dispersion at and directly below the upper surface thereof, and recovering the fluorine compounds that are thus produced.

4,072,592

RADIATION CURABLE COATING

George B. Dué, Pittsburgh, Pa., and John P. Guarino, Trenton, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 551,584, Feb. 20, 1975, abandoned, which is a continuation of Ser. No. 471,412, May 20, 1974, abandoned. This application Sept. 30, 1975, Ser. No. 618,103
Int. Cl.[2] C08F *8/00*
U.S. Cl. 204—159.15 **47 Claims**

1. A radiation curable coating composition that comprises, by weight of said composition, 10–75% of a diacrylate of a diglycidyl ether of a bisphenol, or of a diacrylate of a diglycidyl ether of a bisphenol further esterfied with 0.1–1 mole, per mole of said diacrylate, of a dicarboxylic acid anhydride to form an esterified product having an acid number of 10–40, and 25–90% of an ester of acrylic acid.

4,072,593

PROCESS FOR PRODUCTION OF A RESISTANCE ELEMENT FOR RESISTANCE THERMOMETERS

Walter Diehl, Hanau, and Wolfgang Koehler, Alzenau-Horstein, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Dec. 16, 1976, Ser. No. 751,217
Claims priority, application Germany, Dec. 24, 1975, 2558752
Int. Cl.[2] C23C *15/00*
U.S. Cl. 204—192 F **10 Claims**

1. A process of producing a resistance element for a resistance thermometer by sputtering, said resistance element consisting essentially of a thin platinum layer as the resistance material on an insulating material as a substrate, the improvement comprising applying the platinum to the substrate by sputtering in a gaseous oxidizing atmosphere consisting essentially of krypton-oxygen or xenon-oxygen.

4,072,594

ANODIC STRIPPING VOLTAMMETRIC APPARATUS

Koremitsu Outsuka, Fukuoka, and Yutaka Tanaka, Kitakyushu, both of Japan, assignors to Mitsubishi Kasei Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 3, 1976, Ser. No. 682,784
Claims priority, application Japan, May 13, 1975, 50-56575
Int. Cl.[2] G01N *27/46*
U.S. Cl. 204—195 R **4 Claims**

1. Differential pulse anodic stripping voltammetry apparatus comprising:

an electrolytic cell having a working electrode and a counter electrode;

a source of plating voltage, a source of sweeping stripping voltage and a source of pulse voltage for impressing plating voltage, stripping voltage and pulse voltage respectively across the working electrode and the counter electrode;

a current-voltage converter for converting the current flowing through the working electrode into voltage for producing two sample voltages;

two voltage holding means each having a filter circuit with a time constant of 0.01 to 0.1 second for holding the two sample voltages; and

a differential amplifier for amplifying the difference between the two sample voltages held by the voltage holding means.

4,072,595

ANODE SEAL ASSEMBLY FOR ELECTROLYTIC CELLS

Richard F. Chambers, Athens, and John J. Granade, Cleveland, both of Tenn., assignors to Olin Corporation, New Haven, Conn.

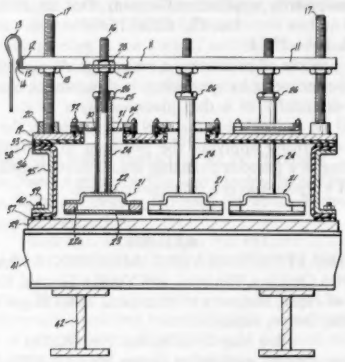
Filed Mar. 7, 1977, Ser. No. 775,127
Int. Cl.[2] C25B *9/00, 1/40*
U.S. Cl. 204—219 **13 Claims**

1. A seal assembly for an electrolytic mercury cell having an adjustable anode post sleeve passing through an anode opening in a cell top lined with a wet chlorine resistant lining turned upwardly through said opening, comprising:

a. a rigid annular disc means, separate from said lining, of wet chlorine resistant material having an inner surface defining a grooved central opening conforming to the exterior of the anode post sleeve, for attachment to the

cell top in sealing contact with said lining so as to occupy a major portion of the anode-to-cell top opening, said opening being of at least twice the diameter of said anode post;

b. connector means for attaching the disc to the cell top and pressing said disc into sealing contact with said lining; and



c. annular wet chlorine resistant elastomeric seal means, adapted to be held within the groove of the central opening of the disc, for continuously sealing between the disc and the anode post sleeve both while the anode is moving and while the anode is stationery.

4,072,596

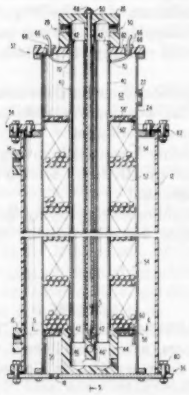
APPARATUS FOR REMOVAL OF CONTAMINANTS FROM WATER

Karl Moeglich, Williamsville, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 573,577, April 30, 1975. This application Mar. 4, 1976, Ser. No. 663,791

Int. Cl.[2] C02B *1/82*; C25B *3/02*

U.S. Cl. 204—241 **23 Claims**



1. An apparatus for the removal of contaminants from aqueous media comprising:

a container having an inlet for admitting said media and an outlet for expelling purified water;

at least one pair of first and second packed beds of particles disposed in said container, said first bed consisting of particles coated with a non-conducting, metal oxide selected from the group consisting of oxides of metals of any of Groups IV*a*, V*a*, VI*b*, and VII*b* and VIII and mixtures thereof, said second bed comprising said metal oxide coated particles and conductive particles said second bed being disposed adjacent said first bed;

first and second pairs of electrodes, disposed, said first pair at least in said first bed, and said second pair at least in said second bed; means coupled to each pair of electrodes for applying alternating current having a frequency of 0.5 to 800 Hz thereto;

means for directing contaminated aqueous media through said inlet and sequentially through each of said beds so that the contaminants therein are subjected to an alternating current electrical field in said beds to decompose and oxidize or reduce said contaminants.

4,072,597

METHOD AND APPARATUS FOR COMPENSATING THE MAGNETIC FIELDS IN ADJACENT ROWS OF TRANSVERSELY ARRANGED IGNEOUS ELECTROLYSIS CELLS

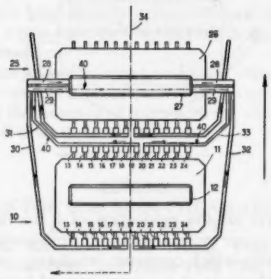
Paul Morel, Le Vesinet, and Jean-Pierre Dugois, Saint Jean-de-Maurienne, both of France, assignors to Aluminum Pechiney, Lyon, France

Filed Nov. 5, 1976, Ser. No. 739,265

Claims priority, application France, Nov. 28, 1975, 75 37675

Int. Cl.[2] C25B *9/04*; C25C *3/16*

U.S. Cl. 204—243 M **6 Claims**



1. A method for compensating the magnetic fields of adjacent rows of transversely arranged igneous electrolysis cells wherein the anode of a downstream cell is fed with current from the cathode of the adjacent upstream cell, the current from the cathode being taken off of inner and outer cathode bars, with the inner cathode bars situated on the side of the adjacent row of cells and the outer cathode bars situated on the side opposite to the adjacent row of cells, superimposing an electrical loop which produces additional magnetic fields substantially equal to that created by the adjacent rows and in the opposite direction by increasing the intensity of the current in the conductor situated on the side of the adjacent row and connecting one of the upstream or downstream ends of the cathode bars of the upstream cell to the anode bar of the downstream cell.

4,072,598

ELECTROLYTIC POLISHING APPARATUS

Lavritz Gudmund Damgaard, Virum, Denmark, assignor to Struers K/S, Copenhagen K, Denmark

Filed Nov. 11, 1976, Ser. No. 740,970

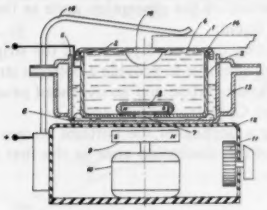
Claims priority, application Denmark, Nov. 12, 1975, 5102/75

Int. Cl.[2] C25F *3/16, 7/00, 7/02*

U.S. Cl. 204—274 **3 Claims**

1. Electrolytic polishing apparatus comprising: an upwardly open container for receiving a quantity of electrolyte for use in the electrolytic polishing operation, said container having a bottom with a central opening, a cover for said container, said cover having a polishing opening against which a polishing sample can be pressed, a magnetic stirrer being provided in said container above said central opening, said stirrer being

rotatable by magnetic means outside said container to set said quantity of electrolyte in rapidly rotating movement to create a flow of electrolyte along the surface of a sample pressed against said polishing opening and at the same time to produce a pressure gradient from said central opening towards the inner



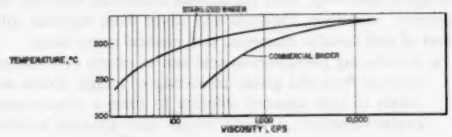
wall of said container, said container being placed in an outer bowl for receiving electrolyte escaping at the top of said container during the polishing operation, the upper face of said cover being located at a higher level than the upper edge of said outer bowl.

4,072,599

CARBON ELECTRODES HAVING STABILIZED BINDERS DERIVED FROM THE ENTIRE ORGANIC FRACTION OF BITUMINOUS COAL

Vaughn L. Bullough, and Luther O. Daley, both of Florence, Ala., assignors to Reynolds Metals Company, Richmond, Va.

Filed Aug. 28, 1975, Ser. No. 608,645
Int. Cl.[2] C25C *7/02*
U.S. Cl. 204—294 **10 Claims**



1. A carbon electrode for use in electrometallurgical manufacturing which consists essentially of a coke aggregate and a stabilized binder having a softening point between about 100° and 150° C that is prepared by heat-treating a concentrated solution of all of the low-volatile organic materials in a bituminous coal, said concentrated solution containing 16–30% of an aromatic liquid hydrocarbon creosote-oil type solvent for said organic materials.

4,072,600

CATALYTIC CRACKING PROCESS

Albert B. Schwartz, Philadelphia, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 440,890, Feb. 8, 1974, abandoned, and Ser. No. 599,920, July 28, 1975, abandoned, each is a continuation-in-part of Ser. No. 399,008, Sept. 20, 1973, abandoned. This application Jan. 15, 1976, Ser. No. 649,261
Int. Cl.[2] C10G *11/04*; B01J *8/24*
U.S. Cl. 208—120 **3 Claims**

1. A process for raising the temperature of a dense bed in the regenerator of a catalytic cracking unit to a predetermined level, said unit comprising a cracking section operating in the absence of added hydrogen and a regenerating section in which CO is combusted in the dilute phase, which unit contains a circulating inventory of solid acidic cracking catalyst; the improvement which comprises:

a. circulating with said catalyst 0.01 to 50 ppm, based on total catalyst inventory, of at least one metal of the group consisting of platinum, palladium, iridium, osmium, rhodium, ruthenium, and rhenium;
b. and causing CO to combust in said dense bed;
c. thereby raising the dense bed temperature to said predetermined level; and
d. maintaining the dense bed temperature at its predetermined level by monitoring the temperature thereof and adding more of said metal when the temperature falls below a set limit.

4,072,601

PROCESS AND APPARATUS FOR PERFORMING ENDOTHERMIC CATALYTIC REACTIONS

Jean Joseph Nicolas Patouillet, Paris, France, assignor to Antar Petroles de l'Atlantique, Paris, France

Filed June 14, 1976, Ser. No. 695,452
Int. Cl.[2] C10G *35/04*
U.S. Cl. 208—134 **14 Claims**

1. In a process for reforming petroleum fractions by endothermic catalytic reactions, consisting of introducing the reaction stream into at least one elongated catalysis zone, constituted by at least one zone containing dilute catalyst and which can itself be preceded by a zone containing an inert catalyst-support, said dilute catalyst zone being followed by a conventional catalysis zone proper, each of said zones being also separable from neighbouring zones by intercalated zones containing no material, and of distributing along said zones heating means capable of providing variable amounts of heat to the reaction stream moving in each of said zones, the improvement consisting essentially of using at the most two zones of dilute catalyst arranged before the pure catalyst zone, if the direction of the reaction stream introduced is considered, and of carrying out the dilution of said dilute catalyst with a bulk material, different from said inert catalyst support and a better heat conductor than said inert catalyst support, which enables the temperature profile to be adapted along the reaction zone to the reaction speed in the latter.

4,072,602

DEHYDROGENATION METHOD AND NONACIDIC MULTIMETALLIC CATALYTIC COMPOSITE FOR USE THEREIN

John C. Hayes, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

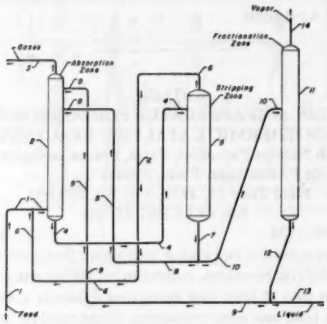
Continuation-in-part of Ser. No. 442,714, Feb. 14, 1974, Pat. No. 3,928,177, which is a continuation-in-part of Ser. No. 216,739, Jan. 10, 1972, Pat. No. 3,806,446, which is a division of Ser. No. 17,886, March 9, 1070, abandoned. This application Dec. 19, 1975, Ser. No. 642,648
The portion of the term of this patent subsequent to Apr. 23, 1991, has been disclaimed.
Int. Cl.[2] C10G *35/06*
U.S. Cl. 208—138 **18 Claims**

1. A method for dehydrogenating a dehydrogenatable hydrocarbon comprising contacting the hydrocarbon, at dehydrogenation conditions, with a catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum group metal, about 0.01 to about 5 wt. % germanium and about 0.01 to about 3 wt. % Group VI-B transition metal; wherein the platinum group metal, germanium and Group VI-B transition metal are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum group metal is present in the elemental metallic state; wherein substantially all of the germanium and Group VI-B transition metal are present in an oxidation state above that of the elemental metal; and wherein the atomic ratio of Group VI-B transition metal to platinum group metal is about 0.05:1 to about 4:1.

4,072,603
PROCESS TO MAKE TECHNICAL WHITE OILS

William W. Wentzheimer, Glen Mills, Pa., assignor to Suntech, Inc., Wayne, Pa.

Filed Oct. 29, 1976, Ser. No. 736,783
Int. Cl.[2] C10G 37/06
U.S. Cl. 208—264 3 Claims



1. A process for making technical white oils in a single hydrogenation and without the need for acid treating to meet white oil specifications which comprises hydrogenating a hydrocracked solvent extracted lubricating oil distilling at 650° to 1050° F, having a SUS/100° F viscosity of about 200 and an aromatic content of less than about 15% in a single step at 600° to 700° F, and at 2000 to 3000 psig in the presence of a catalyst comprising nickel and tungsten supported on silica-alumina, subjecting the hydrogenated solvent lube oil to atmospheric distillation to remove distillates useful as fuels and subjecting the bottoms of said atmospheric distillation to a vacuum distillation to yield technical white oils as products.

4,072,604
PROCESS TO SEPARATE HYDROCARBONS FROM GAS STREAMS

Dennis J. Ward, South Barrington, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 560,854, March 21, 1975, abandoned, which is a continuation-in-part of Ser. No. 453,656, March 21, 1974, abandoned. This application July 19, 1976, Ser. No. 706,859
Int. Cl.[2] C10G 5/04
U.S. Cl. 208—341 5 Claims

1. A process for the separation of C_3 and C_4 hydrocarbons from a gaseous stream which comprises the steps of:

a. introducing a feed stream comprising C_1-C_4 hydrocarbons into a lower portion of an absorption zone while simultaneously introducing a first lean absorber liquid comprising C_7 hydrocarbons and a second lean absorber liquid comprising C_3 and C_7 hydrocarbons into an upper portion of said zone, the first absorber liquid being introduced at a higher elevation than the second absorber liquid;

b. countercurrently contacting the feed stream with the absorber liquids in the absorption zone at conditions effective to absorb C_3 and C_4 hydrocarbons in the absorber liquids;

c. withdrawing a rich absorber liquid comprising C_2, C_3, C_4 and C_7 hydrocarbons from the lower portion of the absorption zone and withdrawing from the upper portion of the absorption zone a gas stream substantially free of C_3-C_4 hydrocarbons;

d. passing the rich absorber liquid into an upper portion of a stripping column operated at stripping conditions effective to remove C_2 hydrocarbons from the rich absorber liquid and thereby effecting the formation of a stripped liquid comprising substantially all of the C_3, C_4 and C_7 hydrocarbons contained in the rich absorber liquid and a stripping column overhead vapor stream comprising C_2 hydrocarbons but substantially free of C_4 hydrocarbons;

e. passing the stripping column overhead stream into the lower portion of the absorption zone;

f. dividing the stripped liquid into a first portion and a second portion of like composition;

g. introducing the first portion of the stripped liquid into the upper portion of the absorption zone as the second lean absorber liquid;

h. fractionating the second portion of the stripped liquid at conditions effective to provide a bottoms stream comprising a C_7 hydrocarbon and an overhead product comprising C_3 and C_4 hydrocarbons; and,

i. supplying a portion of the bottoms stream to the upper portion of the absorption zone as the first lean absorber liquid.

4,072,605
METHOD OF OBTAINING A PRECIPITATE OF METALLIC IONS FROM SOLUTIONS CONTAINING LOW CONCENTRATIONS OF METAL SALTS

Paul F. Thelander, Minneapolis, Minn., assignor to Automated Medical Systems, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 635,910, Nov. 28, 1975, abandoned. This application May 25, 1976, Ser. No. 690,035
Int. Cl.[2] B01D 21/01
U.S. Cl. 210—50 7 Claims

1. The method of precipitating salts of metallic elements having multiple valent states and selected from the group consisting of copper, chromium, zinc, cadmium, nickel, lead, platinum, antimony, iron, manganese, aluminum, thorium, tin, mercury, vanadium, rhodium and silver from aqueous solutions of said metallic elements, said method comprising:

a. introducing phosphorous acid and an excess of a halogen selected from the group consisting of iodine, iodide and iodate to said aqueous solution to form a simultaneous oxidative-reductive cycle within said aqueous solution involving said metallic element; and

b. precipitating and removing the salt of the less soluble valence state of said metallic element from said aqueous solution.

4,072,606
METHOD FOR COAGULATING A COLLOIDAL SUSPENSION

Richard Irwin Leavitt, Lower Makefield Township, Philadelphia County, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 418,489, Nov. 23, 1973, Pat. No. 3,989,592. This application June 14, 1976, Ser. No. 696,091
Int. Cl.[2] B01D 21/01; C07G 7/00; C12D 13/06
U.S. Cl. 210—51 7 Claims

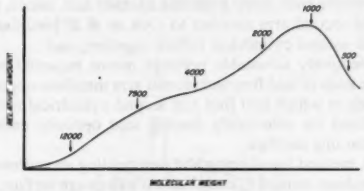
1. A method for coagulating a colloidal suspension, which comprises adding to the colloidal suspension water-soluble nitrogen-containing polymers formed by contacting, under conversion conditions, a water-dispersible protein with the extracellular enzymes formed by the microorganism *Pseudomonas fabricans* No. 492 (A.T.C.C. No. 21984), said water-soluble polymers being further characterized by reversibly thickening in aqueous solution on adjustment of the degree of alkalinity.

4,072,607

PREPARATION OF ANIONIC POLYMERS FOR USE AS SCALE INHIBITORS AND ANTI-PRECIPITANTS

Arthur Maurice Schiller, Stamford; Richard Martin Goodman, Norwalk, and Roger Edgar Neff, Stamford, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 26, 1976, Ser. No. 735,310
Int. Cl.² C02B 5/06
U.S. Cl. 210—58 8 Claims



1. A process for controlling the deposition of adherent scale on the walls of vessels or pipes in a water system, comprising adding to the water in said system an effective amount of an anionic copolymer composed of acrylate and acrylamide linkages in mole ratios of about 20:1 to about 1:1 having a skewed molecular weight distribution such that at least about 60% of said copolymer has a molecular weight of about 500 to 2,000, at least about 10% of said polymer has a molecular weight of about 4,000 to 12,000 and the remainder of said copolymer having a molecular weight of about 2000–4000 on a gel permeation chromatograph wherein the control of said scale is substantially provided by the lower molecular weight material.

4,072,608

POLLUTED WATER PURIFICATION

Floyd Farha, Jr., and E. O. Box, Jr., both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 13, 1976, Ser. No. 648,687
Int. Cl.² C02B 1/34
U.S. Cl. 210—63 R 9 Claims

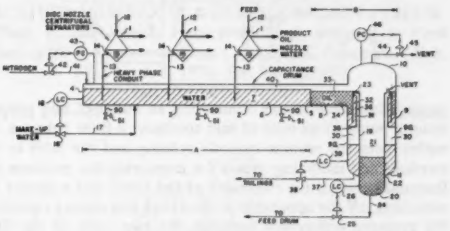
1. A process for the purification of aqueous streams containing organic material impurities dissolved and suspended therein to aqueous products substantially free of organic material which comprises contacting an aqueous stream containing oxidizable organic pollutant impurities and an oxygen-containing gas with an iron group metal promoted solid copper-manganese-oxygen spinel structure catalyst consisting essentially of about 20–65 weight percent copper, about 20–65 weight percent manganese, about 5–50 weight percent iron group metal(s), and the balance oxygen in an amount which is sufficient to meet the valence requirements of the metal components of the finished catalyst under liquid phase oxidation conditions including a temperature ranging from about 300° F to about 575° F and a ratio of water to oxygen ranging from about 5:1 to 200:1 sufficient to convert said organic materials to innocuous materials, thereby converting said aqueous stream to a potable aqueous product which can be safely discarded or reused.

4,072,609

CAPACITANCE SYSTEM FOR HEAVY PHASE DISCHARGE OF SECOND STAGE CENTRIFUGAL SEPARATION CIRCUIT

Thaddeus Eugene Kizior, Edmonton, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of Energy, Mines and Resources, Ottawa; Her Majesty the Queen in right of the Province of Alberta, Government of the Province of Alberta, Department of Energy and Natural Resources, Alberta Syncrude Equity, Edmonton; Ontario Energy Corporation; Imperial Oil Limited, both of Toronto; Canada-Cities Service, Ltd., Calgary and Gulf Oil Canada Limited, Toronto, all of, Canada

Filed Feb. 10, 1977, Ser. No. 767,516
Int. Cl.² B01D 17/02, 33/02
U.S. Cl. 210—73 R 10 Claims



1. In a second stage centrifugal separator circuit which separates heavy phase fluid from degritted diluted bitumen froth, the improvement which comprises:

a plurality of disc-nozzle centrifugal separators, each separator having a heavy phase centripetal pump means, including an outlet, for removing heavy phase fluid from said separator and, in operation, a diluted bitumen-heavy phase fluid interface whose position can be shifted by a change in the fluid pressure at the pump means outlet;

a capacitance vessel comprising a first section and a second section which is an extension of the first section;

a first weir extending across the interior of the capacitance vessel at the junction of the first and second sections, said first weir and first section combining to form a reservoir chamber for containing a reservoir of heavy phase fluid, said first weir being operative to separate diluted bitumen from the heavy phase fluid in the reservoir chamber thereby preventing an accumulation of diluted bitumen in the reservoir chamber;

means, associated with the vessel, for supplying make-up fluid to the reservoir when required;

conduit means connecting the outlet of each centripetal pump means with the reservoir, the end of each conduit means being submerged in the reservoir;

said first weir being positioned downstream of said conduit means;

means, associated with the capacitance vessel, for pressurizing its contents, to thereby maintain fluid backpressure at the centripetal pump means outlets; and

means, asociated with the second section, for removing fluid overflowing the first weir.

4,072,610

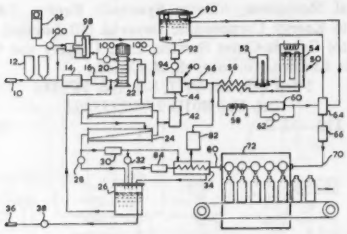
PRODUCTION OF SOLUTIONS

James Gordon Gow, and Alan Gordon England, both of Liverpool, England, assignors to Ingerthorpe Holdings Limited, England

Filed May 1, 1975, Ser. No. 573,503
Int. Cl.² B01D 31/00
U.S. Cl. 210—90 10 Claims

1. An apparatus for the production of an aqueous solution of desired concentration for medical purposes, which comprises a first pump connectible to a source of water, a reverse osmosis

column connected to said first pump, said reverse osmosis column being capable of retaining 100% of bacterial material; a heat steriliser capable of eliminating 100% of bacterial material; a proportioning pump for admixing the pyrogen-free water with a desired material or with a solution of such material of higher concentration than desired to provide said desired concentration; first fluid flow means connecting an outlet of said reverse osmosis column to the proportioning pump;



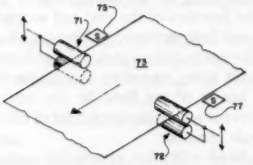
second fluid flow means connecting an outlet of said proportioning pump to an inlet of said steriliser; a filter between the outlet from the reverse osmosis column and the inlet to the steriliser and including means for measuring the pressure differential between the two sides of the filter; and a device for switching off the apparatus in the event that during operation the pressure differential between the two sides of the filter varies from its normal range.

4,072,611

BELT DEWRINKLING AND ALIGNMENT METHOD AND APPARATUS

Steven S. Davis, Bountiful, Utah, assignor to Envirotech Corporation, Menlo Park, Calif.

Filed Jan. 31, 1977, Ser. No. 763,949
Int. Cl.[2] B01D *33/02*
U.S. Cl. 210—143 **11 Claims**



1. In combination with a filtration machine having an endless belt of thin filter medium trained to travel across a drainage surface, which belt of filter medium does not have a bead on either of its edges, a pair of devices for aligning and dewrinkling the belt of filter medium across the drainage surface, each of said aligning and dewrinkling devices of said pair comprising:

a. mounting means which affix the aligning and dewrinkling device rigidly to the filtration machine adjacent an edge of the traveling endless belt of filter medium;

b. a first arm member rigidly connected to said mounting means;

c. a first cylindrical roller and means affixing the same to said first arm member for rotation about the central axis of said first cylindrical roller, said first cylindrical roller being mounted to said first arm member to extend beneath the adjacent edge of the belt of filter medium in a direction generally parallel to the plane of the belt of filter medium;

d. a second arm member and pivot means which connects said second arm member to said first arm member for rocking movement;

e. a second cylindrical roller and means affixing the same to said second arm member for rotation about the central axis of said second cylindrical roller, said second cylindrical roller being mounted to said second arm member to extend above the adjacent edge of the belt of filter medium in a direction generally parallel to the plane of the belt of filter medium to define a long nip line with said first cylindrical roller along which the filter medium is gripped;

f. biasing means connected between the ends of said first and second arm members opposite the ends to which said first and second cylindrical rollers are affixed to urge said opposite ends away from one another and, hence, to urge said second arm member to rock so as to pinch said first and second cylindrical rollers together; and

g. selectively actuatable pressure means mounted between the ends of said first and second arm members opposite the ends to which said first and second cylindrical rollers are affixed for selectively forcing said opposite ends away from one another.

10. A method for aligning and dewrinkling an endless belt of filter medium trained to travel across a drainage surface, which belt of filter medium does not have a bead formed on either of its edges, comprising the following steps:

a. on each side of the belt of filter medium, gripping the belt from above and below with two generally parallel cylindrical rollers where the longitudinal axes of the rollers are at an angle with respect to the direction of travel of the belt and where the cylindrical rollers are connected for rotation to first and second arm members, respectively, which are connected at a fulcrum point for rocking movement one toward the other;

b. sensing the lateral position of the belt of filter medium with two sensors fixed adjacent the two opposite edges of the belt; and

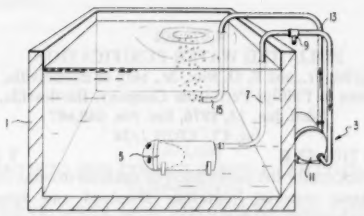
c. forcing the two arm members to pivot to force the rollers toward one another to grip the belt of filter medium according to the lateral position of the filter medium belt determined by said sensor means.

4,072,612

AERATOR FOR BODIES OF WATER

William H. Daniel, Rte. 3, Rogers, Ark. 72756

Continuation of Ser. No. 689,927, May 25, 1976, abandoned.
This application Apr. 27, 1977, Ser. No. 791,531
Int. Cl.[2] C02C *5/06;* B01F *3/04*
U.S. Cl. 210—169 **3 Claims**



1. In combination with a fish tank, an aerator for the fish tank comprising a centrifugal pump having a central inlet and a peripheral outlet and being of the type adapted to receive substantial quantities of air at its inlet without losing its prime, said pump comprising a casing having a rotor that rotates within said casing, said rotor having thereon a plurality of blades of airfoil configuration, conduit means having an inlet end that rests removably on the bottom of said fish tank for introducing water from the bottom of said fish tank to an elevation above the upper edge of the fish tank and into the pump inlet, means for introducing air into the pump inlet, conduit means having its outlet end disposed adjacent the bottom of the fish tank for discharging mixed air and water from the pump outlet adjacent the bottom of the fish tank, and a filter on said inlet end for introducing water into the pump

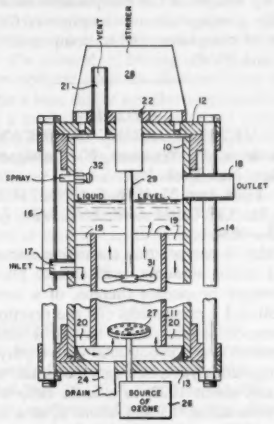
inlet, said filter resting removably on the bottom of the fish tank, said filter comprising a hollow body, and a conical screen whose apex is directed inwardly of said hollow body.

4,072,613

OZONE REACTOR FOR LIQUIDS

Craig S. Alig, Arnold, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 4, 1976, Ser. No. 729,564
Int. Cl.[2] C02B *1/38*
U.S. Cl. 210—198 R **5 Claims**



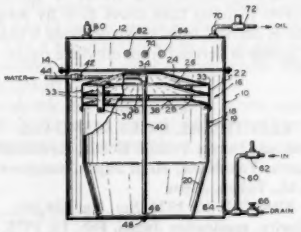
1. An ozone reactor for liquids comprising:
a first means for containing a liquid;
a second means within said first means for producing an inner compartment and an outer compartment within said first means, said compartments being intercommunicating;
a third means for introducing bubbles containing ozone into said inner compartment to produce a flow of liquid from said outer compartment through said inner compartment and thereby react the liquid with the ozone, wherein said third means comprises a sparger connected to a source of ozone under pressure.

4,072,614

OIL AND WATER SEPARATORS

Frank N. Harris, 4761 SW. Martha St., Portland, Oreg. 97221

Continuation of Ser. No. 551,543, Feb. 21, 1975, abandoned, which is a continuation-in-part of Ser. No. 516,193, Oct. 21, 1974, abandoned. This application Feb. 17, 1976, Ser. No. 658,468
Int. Cl.[2] B01D *21/02*
U.S. Cl. 210—305 **16 Claims**



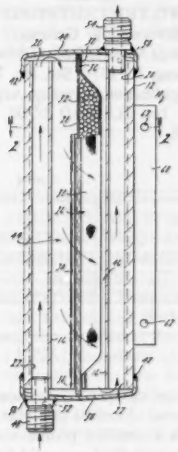
1. An oil and water separator,
a vertical vessel having imperforate walls and open at its top,
an outer container surrounding the vessel and forming an annular vertical passage surrounding the vertical vessel,
inlet means near the bottom of the container opening into the container but not the vessel,
a plurality of discs having central openings,
means mounting the discs at the top of the vessel in positions spaced from each other and defining vertically spaced fully annular passages,
means for flowing an oil-water mixture slowly into the inlet means, upwardly through the annular vertical passage and through the vertically spaced fully annular passages,
water outlet means for drawing water continuously from the lower portion of the vessel,
and oil retaining means for trapping and withdrawing oil flowing upwardly from the openings in the discs.

4,072,615

RECEIVER DRYER FOR A REFRIGERATION SYSTEM

William W. McConnell, Hagerstown, Ind., assignor to Ford Aerospace & Communications Corporation, Dearborn, Mich.

Filed Sept. 1, 1976, Ser. No. 719,883
Int. Cl.[2] B01D *27/02*
U.S. Cl. 210—282 **4 Claims**



1. A receiver dryer for a refrigeration system which comprises:
a receiver dryer body formed in an extrusion operation and having (a) a central axis extending along the interior length thereof, (b) passageway defining means formed as an integral portion of the extruded receiver dryer body for defining at least a pair of open passageways extending along the interior length of said receiver dryer body, and (c) retention rib defining means formed as an integral portion of said extruded receiver dryer body for defining at least two sets of retention ribs extending along the interior length of said receiver dryer body, said two sets of retention ribs defining the lateral edges of a plane which is interposed between said pair of open passageways;
a desiccant receiving device including a planar structural member having a plurality of openings therein and a porous screen portion bonded to said planar structural member and defining therewith an open volume for receiving a granular desiccant therein; said planar structural member having opposite lateral side edges thereof received in opposite sets of said retention ribs of said receiver dryer body and opposite end edges extending beyond both ends of said receiver dryer body whereby said desiccant receiving device defines a barrier between said pair of open passageways;

a granular desiccant located in said open volume of said desiccant receiving device;

a pair of end caps closing off opposite ends of said receiver dryer body, said opposite end edges of said planar structural member of said desiccant receiving device engaging the interior surface of each of said end caps to thereby define first and second separate compartments on each side of said desiccant receiving device with each compartment associated with one of said open passageways;

a first fitting member means secured to one of said end caps for defining a passageway through said one end cap connected to one of said open passageways, whereby a fluid to be treated may flow through said passageway of said first fitting member means and one of said open passageway to reach said first compartment; and

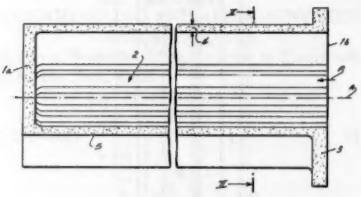
a second fitting member means secured to one of said end caps for defining a passageway through said end cap to said second compartment whereby said fluid in said first compartment can flow through said desiccant receiving device into said second compartment and out from said second compartment through said opening defined by said second fitting member means.

4,072,616

FILTER CARTRIDGE

Rainer Rohlig, Radevormwald, Germany, assignor to Sintermetallwerk Krebsoge GmbH, Radevormwald, Germany

Filed Aug. 10, 1976, Ser. No. 713,192
Claims priority, application Germany, Aug. 14, 1975, 2536271
Int. Cl.² B01D *27/06*
U.S. Cl. 210—493 R **9 Claims**



1. A filter cartridge comprising an elongated porous filter body of sintered metal closed at one end and formed with a plurality of folds in a star-like profile and of uniform cross section and constant wall thickness, said folds extending along the length of said body, and a flange formed unitarily with said body of said sintered metal at the other end of said body, the walls of said folds merging into said flange at said other end, in cross section, each of said folds having a pair of walls bridged externally with a connecting portion and wherein proximal walls of successive folds are bridged by further portions, said folds having a mean width approximately equal to three times the thickness of said walls of said folds.

4,072,617

FINISH FOR ACRYLIC FIBER

Alex K. Jahn, Williamsburg, Va., assignor to Dow Badische Company, Williamsburg, Va.

Filed Apr. 12, 1976, Ser. No. 676,278
Int. Cl.² D06M *13/26*
U.S. Cl. 252—8.9 **8 Claims**

1. A finish for acrylic fiber consisting essentially of:

(A) an alkyl phenol which has been ethoxylated with from about 40 to about 200 moles of ethylene oxide;

(B) the neutralized reaction product of

(1) about 3 moles of an aliphatic monohydric alcohol having from 14 to 22 carbons, and

(2) about 1 mole of P_2O_5; and

(C) a mixture consisting essentially of

(1) about 60 to 80 percent by weight of mineral oil having a viscosity of between about 50 and 150 Saybolt Universal Seconds at 100° F;

(2) about 25 to 10 percent by weight of an aliphatic monohydric alcohol having 10 to 18 carbons, which has been ethoxylated with about 2 to 4 moles of ethylene oxide; and

(3) about 15 to 10 percent by weight of the neutralized reaction product of

(a) about 3 moles of an aliphatic monohydric alcohol having from 8 to 14 carbons, which has been ethoxylated with about 2 to 9 moles of ethylene oxide, and

(b) about 1 mole of P_2O_5;

wherein the amount of component (C) is between about 5 and 70 percent by weight of the composition with the remainder thereof being a composite of components (A) and (B) in a weight ratio of component (A) to component (B) of between about 5/95 and 60/40.

4,072,618

METAL WORKING LUBRICANT

Harry J. Andress, Jr., Wenonah, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 27, 1976, Ser. No. 718,222
Int. Cl.² C10M *1/48, 3/42, 5/24, 7/46*
U.S. Cl. 252—46.6 **4 Claims**

1. A cutting oil composition consisting essentially of a mineral oil and minor amounts, sufficient to provide improved extreme pressure properties thereto, of a component (A) a sulfurized oil and a component (B) the reaction product of a polyalkylenesuccinic anhydride having a molecular weight between about 500 and about 2000 with a polyethyleneglycol or a polypropyleneglycol, having a molecular weight between about 200 and about 1000, in a mole ratio of anhydride to glycol between about 0.5 and about 2, at a temperature between about 150° and about 300° C. for between about 1 hour and about 10 hours to form an intermediate product; and further reacting with said intermediate about 0.01–0.05 part by weight sulfur or about 0.05–0.15 part by weight phosphorus pentasulfide per part by weight intermediate, at a temperature between about 150° and about 250° C. for between about 5 hours and about 10 hours.

4,072,619

ESTER LUBRICANTS CONTAINING POLYOXYALKYLENE PHENOTHIAZINES

Dennis A. Williams, and Robert Carswell, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 30, 1976, Ser. No. 718,641
Int. Cl.² C10M *1/38*
U.S. Cl. 252—47.5 **13 Claims**

1. A lubricant composition comprising an organic ester based synthetic fluid and about 1 to about 90 weight percent of a phenothiazine having an N-substituted polyoxyalkylene group and having a weight average molecular weight range from about 300 to about 5000 wherein the polyoxyalkylene group is derived from an alkylene oxide selected from ethylene, propylene, butylene, styrene oxides or mixtures thereof with the proviso that less than about 85% by weight of said phenothiazine is derived from ethylene oxide when said polyoxyalkylene group is derived from ethylene oxide.

4,072,620

ELECTRICAL INSULATING OIL

Midori Masunaga, Tokyo; Yoshiki Kohno, Kawasaki, and Hiroshi Hasegawa, Yokohama, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Filed Feb. 10, 1976, Ser. No. 656,906
Claims priority, application Japan, Feb. 13, 1975, 50-17480
Int. Cl.² H01B *3/22*
U.S. Cl. 252—63 **6 Claims**

1. An electrical insulating oil consisting essentially of (A) 80

- 99 parts by weight of a refined oil (I) containing not more than 0.25 wt. % of sulphur and more than 25 wt. % to not more than 35 wt. % of aromatic compounds, the refined oil being produced by the steps of:

refining with a solvent capable of selectively dissolving aromatic compounds a distillate contained in a fraction having a boiling range of 230° - 430° C at atmospheric pressure obtained by the distillation of a paraffin or mixed base crude oil at atmospheric pressure or the distillation at a reduced pressure of a bottom oil obtained by the distillation of the crude oil at atmospheric pressure thereby to obtain a raffinate from said distillate,

hydrofining the raffinate so obtained and

dewaxing the thus hydrofined raffinate with a solvent

(B) 1 - 20 parts by weight of an unhydrofined refined oil (II) prepared by treating at least with a solid adsorbent a lubricating oil fraction of a mineral oil having a boiling range of 230° - 460° C at atmospheric pressure obtained from a crude oil thereby to obtain a base oil for the electrical insulating oil, the base oil having a total sulphur content of not more than 0.35 wt. %, and (C) 0.001 - 1.0 part by weight per 100 parts by weight of said base oil, of an essentially amorphous ethylene-propylene copolymer (III) having a weight average molecular weight of 10,000 - 200,000 and a propylene content of 10 - 70 mol %, whereby is obtained the electrical insulating oil having a low pour point as well as excellent oxidation stability, thermal stability, corona resistance and corrosion resistance.

4,072,621

DETERGENT COMPOSITION

Terence James Rose, Tervuren, Belgium, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Nov. 11, 1975, Ser. No. 631,030

Claims priority, application United Kingdom, Nov. 13, 1974, 49174/74

Int. Cl.[2] **C02B** *1/44;* **C11D** *1/72, 3/20, 3/37*

U.S. Cl. 252—89 R **12 Claims**

1. A detergent composition capable of rapidly reducing the free polyvalent metal ion content of an aqueous solution, comprising:

(a) from about 5 to about 65% by weight of a water-insoluble metallo-silicate ion exchange material of the formula

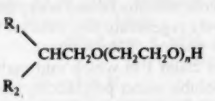
$$M_z[(MeO_2)_z \cdot (SiO_2)_y] xH_2O$$

wherein M is a calcium exchangeable cation, Me is either aluminum or boron, z and y are integers; the molar ratio of z to y is in the range from about 1.0 to about 0.5 and x is an integer from about 15 to about 264; said metallo-silicate ion exchange material having a particle size diameter of from about 0.2 micron to about 10 microns; a calcium ion exchange capacity of at least about 200 mg. $CaCO_3$ eq./g.; and a calcium ion exchange rate of at least about 2 grains Ca^{++}/gallon/minute/gram;

(b) from about 10 to about 50% by weight of a nonionic surface-active agent selected from the group consisting of:

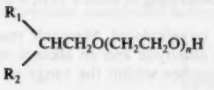
(i) a water-soluble nonionic surface-active agent having the formula $R(OC_xH_{2x})_n OH$ wherein R represents an alkyl or alkenyl group having from 8 to 22 carbon atoms or an alkylated or alkenylated phenyl group having from 6 to 12 carbon atoms in the alkyl or alkenyl group, x is 2 or 3 and n ranges from 1 to 8, said nonionic surface-active agent having a hydrophilic lipophilic balance (HLB) of less than about 10.0.

(ii) a nonionic polyethoxy surface active agent having a HLB in the range from 11:14.5 in conjunction with a component of the formula



wherein R_1 is a straight chain alkyl group, R_2 is H or $-CH_3$, the total number of carbon atoms in R_1 and R_2 is from 10 to 13, R_2 is CH_3 in from 40 to 60% by weight of the corresponding unethoxylated alcohols, and the average degree of ethoxylation n is from 2.5 to 4;

(iii) a nonionic polyethoxy surface-active agent having a HLB in the range from 11:14.5 in conjunction with a nonionic surface-active agent of the formula



wherein R_1 is a straight chain alkyl group, R_2 is H or $-CH_3$, the total number of carbon atoms in R_1 and R_2 is from 10 to 13, R_2 is CH_3 in from 15 to 30% by weight of the unethoxylated alcohols, and the average degree of ethoxylation n is from 3 to 4; and

(iv) mixtures thereof; and

(c) from about 0.10 to about 6% by weight of a water-soluble derivative of a copolymer of

(1) a vinyl compound having the general formula RCH = CHR wherein one R represents a hydrogen atom and the other R represents an alkyl ether radical containing from one to about four carbon atoms and

(2) maleic anhydride; the ratio of (1) to (2) being from 2:1 to 1:2.

4,072,622

STABLE AQUEOUS SUSPENSION OF WATER-INSOLUBLE, CALCIUM-BINDING ALUMINOSILICATES AND ORGANIC SUSPENDING AGENTS

Dieter Kühling, Monheim; Josef Huppertz, Dusseldorf-Holthausen; Peter Krings, Krefeld, and Herbert Reuter, Hilden, all of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA), Dusseldorf-Holthausen, Germany

Filed Oct. 7, 1975, Ser. No. 620,387

Claims priority, application Austria, Oct. 10, 1974, 8151/74; Germany, June 19, 1975, 2527388

Int. Cl.[2] **B01F** *3/12, 17/00;* **B01J** *29/06;* **C02B** *1/44*

U.S. Cl. 252—179 **10 Claims**

1. An aqueous suspension having a pH of between 7 and 12 of water-insoluble, calcium-binding aluminosilicates with an improved stability against settling consisting essentially of (A) from 20% to 50% by weight on the anhydrous basis of at least one crystalline, finely-divided, water-insoluble silicate compound having a calcium-binding power of at least 50 mg CaO/gm of anhydrous active substance and a primary particle size of from 0.1μ to 100μ and having the formula, combined water not shown

$$(M_2O)_x \cdot Me_2O_3 (SiO_2)_y$$

where M is a member selected from the group consisting of sodium and potassium, x is a number of from 0.7 to 1.5, Me is aluminum or boron, and y is a number from 0.8 to 6, and (B) from 0.5% to 6% by weight of at least one organic dispersing agent selected from the group consisting of the free acids and alkali-metal salts of

1. an organic phosphonic acid having at least one further acid group selected from the group consisting of phosphonic acid and carboxyl, and

2. an alkyl acid phosphate emulsifier having from 4 to 10 carbon atoms in the alkyl, in water, said aqueous suspension being capable of being pumped after 24 hours of standing.

4,072,623
POLYURETHANE FOAM SYSTEM

David E. Hayden, and Millard E. Foucht, both of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toldeo, Ohio

Filed Nov. 28, 1975, Ser. No. 636,321
Int. Cl.[2] C08G *18/32, 18/12*
U.S. Cl. 252—182 9 Claims

1. A polyol composition comprising at least a first, a second and a third polyol wherein,
   a. said first polyol is an oxyalkylated Mannich reaction product of a phenol, an aldehyde and an alkanol amine, reacted to a hydroxyl number within the range of from about 350 to about 650;
   b. said second polyol is an oxyalkylated polyamine reacted to a hydroxyl number within the range of from about 600 to about 800; and
   c. said third polyol is pentaerythritol oxyalkylated to a hydroxyl number within the range of from about 350 to about 650.

4,072,624
GELATIN COMPOSITION

Ronald John Croome, Rhiwbina, and Donald Beuford Thomas, Creigiau, both of Wales, assignors to P. Leiner & Sons Limited, Treforest, Wales

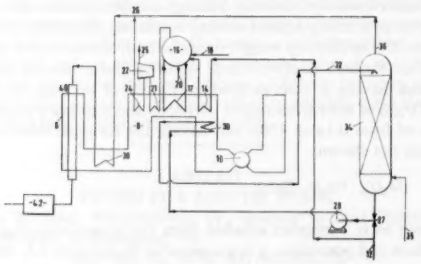
Filed Oct. 18, 1976, Ser. No. 733,416
Claims priority, application United Kingdom, Oct. 20, 1975, 43012/75
Int. Cl.[2] C09K *11/00*
U.S. Cl. 252—301.35 11 Claims

1. The product of the chemical reaction of a synthetic polymer having a multiplicity of primary amino groups with an optical brightening agent having a single functional group per molecule for reaction with the said primary amino groups of the polymer, said product being capable of forming a homogeneous aqueous solution with gelatin.

4,072,625
STEAM-HYDROCARBON PROCESS

Alwyn Pinto, Stockton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Feb. 20, 1976, Ser. No. 659,630
Claims priority, application United Kingdom, Mar. 3, 1975, 8732/75; Apr. 9, 1975, 14553/75
Int. Cl.[2] C01B *2/16*
U.S. Cl. 252—373 8 Claims



1. A process of treating hydrocarbons which comprises:
   a. reacting a normally gaseous hydrocarbon with steam endothermically over a catalyst at an outlet temperature in the range 700° to 900° C. in a reaction zone heated by a combustion furnace, to give a process gas stream containing hydrogen, carbon monoxide and carbon dioxide;
   b. recovering heat by cooling the process gas stream resulting from said reaction of a hydrocarbon with steam in heat exchange in a boiler raising steam at the pressure in the range of 60 to 120 ata. and then with feed water for said boiler, until the temperature of said process gas stream has fallen to 150° to 300° C;
   c. transferring heat contained in said process gas stream at 150° to 300° C., to water under pressure; and
   d. bringing the resulting hot water under pressure into direct heat exchange with the normally gaseous hydrocarbon to be reacted in step (a), to provide 10 to 30% of the steam to tbe reacted in step (a).

4,072,626
AMINE SALT COMPOSITION USEFUL IN INHIBITING METAL CORROSION

Donald C. Finney, Bellevue, Pa., assignor to A. F. Industries, Inc., Pittsburgh, Pa.

Filed Apr. 12, 1976, Ser. No. 676,158
Int. Cl.[2] C23F *11/00*
U.S. Cl. 252—389 A 8 Claims

1. A composition comprising:
   a. dicyclohexylammonium pelargonate; and,
   b. a polyphosphate; said (a) and (b) being present in sufficient amounts to inhibit metal corrosion in a saline environment.

4,072,627
URIC ACID DETERMINATION

E. Melvin Gindler, Rockford, Ill., assignor to Pierce Chemical Company, Rockford, Ill.

Filed Aug. 2, 1976, Ser. No. 710,801
Int. Cl.[2] C09K *3/00;* G01N *31/06, 31/22, 33/16*
U.S. Cl. 252—408 10 Claims

1. In an aqueous solution useful in connection with a redox type spectrophotometric or colorimetric determination of uric acid in a biologic fluid comprising a multivalent metallic ion reducible to a lower valence state by uric acid and a water soluble chelating compound capable of complexing with said metallic ion after reduction by uric acid to yield, in complexed form, a colored complex; the improvement wherein said solution also contains, as an added constituent, imidazole, or a combination of imidazole and a water soluble alpha-amino acid, said constituent being present in an amount such that, when said solution contains a biologic fluid containing protein and uric acid, a buffer system such that the pH of the solution is 6 to 12, and a multivalent metal ion, said protein in said fluid does not significantly reduce said multivalent ions present in said solution.

4,072,628
REGENERATION OF SUPPORTED RUTHENIUM CATALYST

Walter M. Kruse, and Leon W. Wright, both of Wilmington, Del., assignors to ICI Americas Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 520,926, Nov. 5, 1974, Pat. No. 3,963,788, and Ser. No. 531,972, Dec. 12, 1974, Pat. No. 3,963,789. This application Mar. 30, 1976, Ser. No. 671,966
Int. Cl.[2] B01J *29/38, 23/96;* C07C *31/18*
U.S. Cl. 252—415 15 Claims

1. A process for regenerating a supported ruthenium catalyst which has been used to convert a carbohydrate in an aqueous medium at a pH of about 3 to about 7.5 to a polyhydric alcohol or mixture of polyhydric alcohols in the presence of hydrogen under elevated pressure at a temperature in the range of about 100° C. to about 200° C., said process comprising separating said catalyst from the reaction medium and contacting said catalyst with a dilute aqueous solution of a water soluble acid, the concentration of said aqueous solution of said water soluble acid being such as to effectively regenerate said catalyst without dissolving an appreciable portion of the support.

13. A process according to claim 1 in which said carbohydrate is an essentially water soluble water polysaccharide-containing carbohydrate, the catalyst support is carbon or a crystalline aluminosilicate selected from the group consisting of Y

type zeolites and acid-activated clays having base exchange capacity, and the acid is a water soluble mineral acid.

14. A process according to claim **13** in which said solution has an acid concentration in the range of about 0.1 N to about 0.5 N, the catalyst support is a Y type zeolite or an acid activated crystalline aluminosilicate clay having base exchange capacity, and said catalyst is contacted with said solution of said acid at approximately room temperature.

4,072,629

REGENERATION OF ALKENE DISPROPORTIONATION CATALYST

Frank J. Janssen, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 531,515, Dec. 11, 1974, abandoned. This application Oct. 26, 1976, Ser. No. 735,580

Claims priority, application United Kingdom, Dec. 18, 1973, 58480/73

Int. Cl.[2] **B01J** *21/20, 23/92;* **C07C** *3/62*

U.S. Cl. 252—416 **7 Claims**

1. A process for the regeneration of solid alkene disproportionation catalysts selected from the group consisting of oxides of molybdenum, cobalt, tungsten, rhenium and mixtures thereof supported on alumina or silica which have been used to disproportionate alkene feeds containing at least thirty percent of the alkenes in said feed with carbon numbers of twelve or more and which catalysts have been deactivated by the deposition of organic material which process comprises first contacting the deactivated catalyst with a regenerating alkene or mixtures of alkenes having from 2 to about 5 carbon atoms per molecule at a temperature of from about 50° to about 350° C and then contacting the catalyst with an oxygen-containing gas at a temperature between about 100° and 650° C.

2. The process of claim **1** wherein the regenerating alkene is selected from the group consisting of propylene, 2-butene and mixtures thereof.

3. The process of claim **2** wherein the catalysts comprise oxides of molybdenum, cobalt, tungsten, rhenium and mixtures thereof supported on gamma-alumina.

4,072,630

METAL PHTHALOCYANINE CATALYST PREPARATION

Walter M. Douglas, Streamwood, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Feb. 17, 1976, Ser. No. 658,791

Int. Cl.[2] **B01J** *27/24*

U.S. Cl. 252—430 **10 Claims**

1. A method of preparing a supported metal phthalocyanine catalyst which comprises successively impregnating a solid adsorbent carrier material with a solution of an alkali metal phthalocyanine and with a metal salt solution comprising a metal exchangeable with said alkali metal, said metal salt being in sufficient amount to provide an exchange metal/alkali metal phthalocyanine weight ratio of from about 1.5:1 to about 3.0:1 and effecting a substantially complete metal cationic exchange between said metal salt and said alkali metal phthalocyanine.

4,072,631

VANADYL ALCOHOLATE, ORGANIC TITANATE, POLYHYDRIC ALCOHOL COMPOSITIONS AS ESTERIFICATION/TRANSESTERIFICATION CATALYSTS

Herwart Curt Vogt, Grosse Ile; Manher Parekh, Woodhaven; Moses Cenker, Trenton, and John Thomas Patton, Jr., Wyandotte, all of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 1, 1976, Ser. No. 746,422

Int. Cl.[2] **B01J** *31/12*

U.S. Cl. 252—431 R **4 Claims**

1. A composition consisting essentially of the reaction product of (A) an organic titanium compound having the formula:

$$Ti(OR)_4$$

wherein R is a radical selected from the group consisting of an aliphatic radical having from 1 to 18 carbon atoms, an alicyclic radical having between 1 and 3 rings, between 5 and 6 carbon atoms per ring, and between 5 and 18 carbon atoms per molecule, an aromatic radical having between 1 and 3 rings and between 6 and 18 carbon atoms per molecule with (B) a vanadyl alcoholate compound having the formula:

$$\begin{matrix} O \\ \| \\ V(OR)_3 \end{matrix}$$

wherein R is a radical selected from the group consisting of an aliphatic radical having from 1 to 18 carbon atoms, an alicyclic radical having between 5 and 6 carbon atoms, and a benzyl radical, and (C) a polyhydric alcohol containing 2 or 3 hydroxy groups selected from the group consisting of aliphatic, alicyclic, and aromatic polyhydric alcohols, and ether compounds of aliphatic and aromatic polyhydric alcohols wherein the mole ratio of the titanium compound to the vanadyl compound to the polyhydric alcohol compound is 1:1:1.

4,072,632

DISHWASHING COMPOSITIONS

David Alan Reed, Wallasey, England, assignor to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 345,796, March 28, 1973, abandoned. This application Dec. 10, 1975, Ser. No. 639,498

Claims priority, application United Kingdom, Apr. 6, 1972, 15832/72

Int. Cl.[2] **C11D** *1/12, 1/14, 1/28, 1/27*

U.S. Cl. 252—541 **7 Claims**

1. A lather stable dishwashing detergent composition comprising a mixture of:

a. a dialkyl ester salt of a sulphosuccinic acid wherein each alkyl radical is selected from the group consisting of heptyl, octyl and nonyl and the cation is selected from the group consisting of an alkali metal and ammonium; and

b. a sulphate of the formula $R(OC_2H_4)_nOSO_3M$ wherein R contains from 11 to 18 carbon atoms and is selected from the group consisting of linear alkyl, branched alkyl and mixtures of linear and branched alkyl, *n* is an integer from 1 to 40 when R is derived from a primary alcohol, and 2 to 40 when R is derived from a secondary alcohol; and M is a cation selected from an alkali metal and ammonium;

components (a) and (b) above being present in a weight ratio in the range of from 10:90 to 99:1.

4,072,633

NOVEL PROCESS

Johny C. Hermans, Wespelaar, Belgium, assignor to S.A. Texaco Belgium N.V., Brussels, Belgium

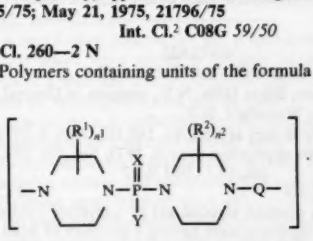
Filed Nov. 3, 1975, Ser. No. 628,286

Claims priority, application United Kingdom, May 21, 1975, 21795/75; May 21, 1975, 21796/75

Int. Cl.[2] **C08G** *59/50*

U.S. Cl. 260—2 N **17 Claims**

1. Polymers containing units of the formula



wherein

X represents an oxygen or sulphur atom, or a group of the formula >N—R in which R represents an aliphatic, cy-

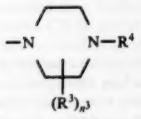
cloaliphatic or aromatic hydrocarbon group or a heterocyclic group, or X may be absent;

Y represents an aliphatic, cycloaliphatic or aromatic hydrocarbon group, or a heterocyclic group;

a group of the formula —NHR or —NR_2 in which R has the meaning given above, or in which the two groups R and the nitrogen atom to which they are attached represent a N-containing heterocyclic group;

a group of the formula —OR in which R has the meaning given above; or

a group of the formula



R^1, R^2, R^3 and R^4 each represents a hydrocarbon substituent on a piperazine ring;

n^1, n^2 and n^3 each represents zero or an integer; and

Q represents the residue of a symmetrical or unsymmetrical bis-epoxide.

4,072,634

PRODUCTION OF POLYURETHANE FOAMS FROM MODIFIED POLYESTER POLYOL PREPOLYMERS

Alfred E. Borchert, Cherry Hill, N.J., and Charles J. Kremer, Brookhaven, Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

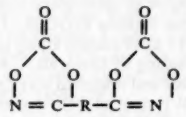
Filed Mar. 12, 1973, Ser. No. 340,406

Int. Cl.[2] C08G *18/46, 18/10, 18/14*

U.S. Cl. 260—2.5 A **5 Claims**

1. A method of preparing a foam polyurethane composition having improved light and hydrolytic stability comprising:

(a) Forming a modified polyester prepolymer having a hydroxyl functionality between 2 and 3 by reacting a cyclic nitrile carbonate having the structure:



wherein R is a saturated aliphatic or alicyclic organic radical free of reactive hydrogens as determined by the Zerewitinoff Test having up to about 50 carbon atoms with a polyester polyol having a hydroxyl number of about 50 to about 450, the relative amounts of polyester polyol and cyclic nitrile carbonate being sufficient to provide a ratio of hydroxyl groups to cyclic nitrile groups of about 2 to 10:1, and

(b) Reacting the modified polyester polyol with an aromatic polyisocyanate in the presence of an amount of water sufficient to produce a foam of the desired density.

4,072,635

ORGANOSILOXANE GELS

Edward M. Jeram, Burnt Hills, N.Y., assignor to General Electric Company, Waterford, N.Y.

Continuation-in-part of Ser. No. 160,162, July 6, 1971, abandoned. This application June 6, 1975, Ser. No. 584,392

Int. Cl.[2] C08J *9/32*

U.S. Cl. 260—2.5 S **18 Claims**

1. A reaction product silicone gel of a mixture comprising reacting (1) an organosiloxane having a viscosity of from 10 to 10,000 centistokes at 25° C, and being a copolymer consisting essentially of units of the formula $R_2ViSiO_{0.5}$, $RViSiO$, R_2SiO and $MeR_2SiO_{0.5}$, where each R is individually selected from the group consisting of methyl and phenyl radicals and Vi represents a vinyl radical, at least 0.50 molar percent of the units in said copolymer being $R_2ViSiO_{0.5}$ units and $RViSiO$ units where the terminal groups are at least 50 mole percent $ViR_2SiO_{0.5}$ units and may have as the rest of the total terminal units $MeR_2SiO_{0.5}$ units, (2) a liquid hydrogen siloxane of the average general formula $XRMeSiO(R_2SiO)_n(RHSiO)_m$-$SiMeRX$, where each R is as above defined and X is selected from the group consisting of H and R, no more than 25 molar percent of the total R radicals present in (1) and (2) being phenyl, and n and m have such average values that the viscosity of the hydrogen siloxane is no more than 10,000 centistokes at 25° C and m is at least 1, in the presence of a platinum or platinum compound catalyst in an amount sufficient to furnish at least 0.1 part per million of platinum based upon the combined weights of (1) and (2); the properties of (1) and (2) being such that prior to reaction there is an average of from 1.4 to 1.8 gram atoms of the silicon-bonded hydrogen atoms in (2) per gram molecular weight of (1) and there being at least one vinyl siloxy unit in (1) for every silicon-bonded hydrogen atom in (2), the molecular weight of (1) being calculated by the equation:

$$\log \text{visc.} = 1.00 + 0.0123M^{.5}$$

where M is the molecular weight and "visc." is the viscosity of (1) in centistokes at 25° C.

4,072,636

PROCESS FOR PREPARING SMOKE-RETARDANT POLYISOCYANURATE FOAM

Kaneyoshi Ashida, Chofu; Masaaki Ohtani, Kawasaki, and Shoichi Ohkubo, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Mar. 3, 1976, Ser. No. 663,503

Claims priority, application Japan, Mar. 7, 1975, 50-27780; Mar. 10, 1975, 50-28853

Int. Cl.[2] C08G *18/14*

U.S. Cl. 260—2.5 AW **13 Claims**

1. In a process for preparing a smoke-retardant polyisocyanurate foam by reacting an organic polyisocyanate in the presence of a blowing agent and an isocyanate-trimerization catalyst, an improvement characterized in that the reaction is conducted in the presence of from 0.7 to 1.5 wt. %, as Si, of an organosilicate having the formula $Si(OR)_4$ or $R_nSi(OR')_{4-n}$ wherein R and R' are the same or different and represent aliphatic, alicyclic and aromatic hydrocarbon groups having 1 - 12 carbon atoms or substituted derivatives thereof and n is an integer of 1 to 3.

4,072,637

PROCESS FOR THE PRODUCTION OF POLYURETHANE RESINS AND FOAMS UTILIZING SILICO-FORMIC ACID

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 262,485, June 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 71,628, Sept. 11, 1970, abandoned. This application July 25, 1975, Ser. No. 599,000

Int. Cl.[2] C08G *18/38*

U.S. Cl. 260—2.5 AM **11 Claims**

1. A process for the production of isocyanate-silico-formate compositions which comprises the steps of:

(a) providing about 1 mol of silico-formic acid;

(b) mixing therewith from about 0.5 to about 2 mols of an organic diisocyanate compound;

(c) maintaining said mixture at a temperature of from about 20° C to about 60° C; and

(d) agitating said mixture until a smooth, creamy appearance is obtained.

2. The process according to claim 1, including the further steps of adding a foaming agent to said mixture after step (d) and heating said mixture to a temperature of from about 90° C

to about 150° C until said mixture expands in volume at least 4 times, forming a self-sustaining foam.

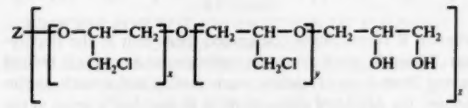
4,072,638

HALOGENATED POLYETHER POLYOLS AND POLYURETHANE FOAMS PRODUCED THEREFROM

Jean-Claude Boulet, Tavaux-Cite, France; René Walraevens, Brussels, Belgium; Gérard Bonnety, Tavaux-Cite, France; Jacques Lolivier, and Paul Trouillet, both of Brussels, Belgium, assignors to Solvay & Cie, Brussels, Belgium

Division of Ser. No. 607,595, Aug. 25, 1975, abandoned, which is a continuation of Ser. No. 353,536, April 23, 1973, abandoned.
This application Oct. 4, 1976, Ser. No. 729,424
Claims priority, application Luxembourg, May 15, 1972, 65359; Feb. 12, 1973, 67005
Int. Cl.[2] C08G *18/50*
U.S. Cl. 260—2.5 AP 15 Claims

1. A process for the production of rigid and semi-rigid, fire-resisting polyurethane foams which comprises reacting in the presence of a foaming agent and a reaction catalyst an organic polyisocyanate and at least one polyetherpolyol having the general formula:



in which z represents a number between 2 and 6, x and y represent numbers between 0 and 12 such that the means value $\overline{x+y}$ per chain is between 0 and 12, and that $z\overline{(x+y)}$, in which $\overline{x+y}$ represents the mean value of $x+y$ in the entire molecule, is between 1 and 72, and Z represents a radical of valence z which is the residue of an organic polyhydroxyl compound initiator having from 2 to 6 hydroxyl groups.

4,072,639

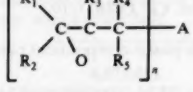
UNDERCOATING COMPOSITION FOR POLYESTERS CONTAINING EPOXY COMPOUNDS

Teruo Yamaguchi, and Hidefumi Sera, both of Ninami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Mar. 5, 1976, Ser. No. 664,224
Claims priority, application Japan, Mar. 7, 1975, 50-27785
Int. Cl.[2] C08L *89/00*
U.S. Cl. 260—6 6 Claims

1. An undercoating composition for photographic polyester film wherein the polyester is a condensation product of a dibasic aromatic acid and a glycol which contains (1) a compound having two or more epoxy groups in its molecule and a molecular weight of about 1,000 or less, said compound being represented by general formula (I):

(I)



wherein R_1 to R_5, which may be the same or different, represent a hydrogen atom or an alkyl group having 1 to 3 carbon atoms, n represents an integer of 2 to 6 and A represents a linear or cyclic group having n nitrogen atoms or n oxygen atoms where the nitrogen atoms or oxygen atoms are directly bonded to the glycidyl group, a 5- or 6-membered heterocyclic ring having two or more active nitrogen atoms in the ring, a nitrogen atom, a phosphate group or a sulfate group; and (2) water as a primary solvent or sole solvent.

4,072,640

COPOLYMERIZATION OF VINYL MONOMERS WITH CELLULOSE AND STARCH IN COPPER AMMONIUM SOLUTIONS

Jose M. Sosa, Altos de Pipe, Venezuela, assignor to Instituto Venezolano de Investigaciones Cientificas, Estado Miranda, Venezuela

Filed Jan. 29, 1976, Ser. No. 653,511
Int. Cl.[2] C08L *1/02, 3/02*
U.S. Cl. 260—17.4 GC 10 Claims

1. A process for the copolymerization of starch or cellulose with a vinyl monomer or monomers, comprising:

dissolving the starch or cellulose in a copper ammonium solution and adding the vinyl monomer or monomers thereto;

catalyzing polymerization with heat or light until the desired polymer is achieved; and

recovering the polymer so produced.

4,072,641

POLYAMIDE RESINS AND METHOD FOR MANUFACTURE

Melvin L. Loeb, Northbrook, Ill., assignor to Kraftco Corporation, Glenview, Ill.

Filed Oct. 28, 1975, Ser. No. 625,824
Int. Cl.[2] C08G *69/26*
U.S. Cl. 260—18 N 8 Claims

1. A polyamide resin resistant to gelling comprising the polycondensation reaction product of a reaction mixture of an alkylene diamine, a polymeric fatty acid and a monocarboxylic fatty acid chain stopping agent, said polymeric fatty acid having less than about 2 percent by weight of monobasic acids, from about 75 to 96 percent by weight of dibasic acids and from about 4 to about 25 percent by weight of tribasic or higher acids, said chain stopping agent including a branched chain monocarboxylic acid which is liquid at room temperature and which is selected from the group consisting of C_{16} - C_{20} saturated and unsaturated fatty acids wherein there are from 1 to 5 total carbons in the branching groups and the branching groups are from C_1 - C_4, the total number of amine groups and hydroxyl groups (if any) in said reaction mixture being substantially equivalent and no more than about 10 percent more or less than the total number of carboxylic groups provided by said polymeric fatty acid and said monocarboxylic fatty acid chain stopping agent, said chain stopping agent contributing from about 8 to about 16 percent of the total carboxylic groups.

4,072,642

ALKYD RESINS

Jurgen Ritz, Mainz-Mombach; Rolf Zimmermann, Wiesbaden, and Hannes Fischer, Taunusstein, Wehen, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

Filed Sept. 2, 1975, Ser. No. 609,709
Claims priority, application Germany, Sept. 2, 1974, 2441922
Int. Cl.[2] C08G *63/20, 63/48, 63/52*
U.S. Cl. 260—22 CB 11 Claims

1. A multi-stage process for the preparation of a fatty acid modified alkyd resin which is capable of air-drying in the absence of a peroxide which comprises first forming a reaction product by reacting in a first step A only

(I) at least one α,β-olefinically unsaturated dicarboxylic acid component or a mixture thereof with

(I') a polycarboxylic acid component being free from polymerisable olefinic and acetylenic bonds, the mol percent of (I) being up to 50% of (I) + (I'),

(II) at least one trihydric alcohol or a mixture thereof with a minor amount of a dihydric alcohol and

(III) dicyclopentadiene at a temperature up to 160° C and subsequently in a second step B adding to the product formed in A

(IV) at least one aliphatic monocarboxylic acid component

selected from the group consisting of an unsaturated fatty acid and its esters, and further esterifying and modifying A with (IV) at a temperature of at least 160° C to yield an alkyd resin containing from (1) 10 to 35% by weight of cyclopentadiene units and wherein (2) the amount by weight of the aliphatic monocarboxylic acid components added is between 20 and 60% by weight of the total reaction mixture, but at least as large as the total amount of the polycarboxylic acid component, the latter being calculated as anhyride.

4,072,643

FLAME-RETARDED POLYOLEFIN BLEND WITH GOOD BALANCE OF PROPERTIES

Howard W. Bost, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 2, 1976, Ser. No. 663,007
Int. Cl.[2] C08K *5/34, 5/51*
U.S. Cl. 260—23 H **10 Claims**

1. A flame-retarded polymeric composition comprising:

a. a polymer blend consisting essentially of from 40 to 50 weight percent of a polypropylene having a melt flow in the range of 10 to 15 g/10 min. and a density in the range of 0.90 to 0.91 g/cc., 25 to 35 weight percent of a polyethylene having a melt flow index in the range of 15–20 g/10 min. and a density in the range of 0.950–0.960, and 20 to 30 weight percent of a substantially amorphous ethylene/-propylene copolymer having a Mooney Viscosity ML (1 + 8 min.) at 260° F in the range of 55–70 and a density of about 0.86 g/cc., having incorporated therein

b. from 10 to 50 parts per 100 parts of said blend of a cured intumescent flame retardant comprising the reaction product of a phosphorus oxide of the formula $P_2O_5.xH_2O$, wherein x is a number having a value of 0 to 3; a saturated acyclic polyol having from 5 to 15 carbon atoms and from 4 to 8 hydroxyl groups per molecule; a nitrogen compound selected from the group consisting of melamine, dicyandiamide, urea and dimethylurea; and, optionally, a color improving compound of the formula $R—Y_z$, having from 2 to 24 carbon atoms per molecule, wherein Y is selected from the group consisting of —OH, —COOH —NR'_2, z is a number having a value of 1 or 2, R is a hydrocarbyl radical having a valence of z selected from the group consisting of alkyl, cycloalkyl and alkoxy, and R′ is —H or —R; which reaction product is thereafter cured by heating.

4,072,644

WATER BASED PRINTING INK

Ross M. Hedrick, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed May 17, 1976, Ser. No. 687,413
Int. Cl.[2] C08L *23/00*
U.S. Cl. 260—29.6 HN **22 Claims**

1. An aqueous based printing ink comprising ink pigment, water and a polymer solubilized in said ink by a rapid removable solubilizing component, said polymer being capable of forming a water-insensitive gel film upon removal of said rapid removable solubilizing component.

4,072,645

TRANSPARENT PRE-CURE COATING FOR RUBBERY POLYMERS

Richard J. Cogley, Jr., South Gate, Calif., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed July 19, 1976, Ser. No. 706,354
Int. Cl.[2] C08L *9/10*
U.S. Cl. 260—29.7 M **10 Claims**

1. A pre-cure paint comprising:

a. a rubbery diene polymer,

b. hydrated amorphous silica,

c. a zinc salt or zinc complex which is soluble in the rubbery diene polymer, and

d. a paint vehicle.

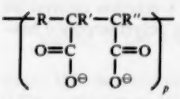
4,072,646

CONJUGATED DIENE-MALEIC ACID DERIVATIVE COMPOSITIONS AND PROCESS FOR PREPARING THE SAME

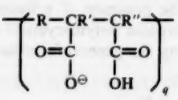
Hiroyuki Ito, and Hirosuke Imai, both of Yokohama, Japan, assignors to Nippon Oil Company Limited, Tokyo, Japan

Filed Oct. 20, 1975, Ser. No. 624,225
Claims priority, application Japan, Oct. 23, 1974, 49-121522
Int. Cl.[2] C08L *9/00, 9/10*
U.S. Cl. 260—29.7 H **16 Claims**

1. Novel liquid compositions comprising (A) high-molecular anions from dissociation of a part or the whole of the carboxylic acid group of a conjugated diene-maleic acid derivative copolymer with repeating units represented by the formulae



and



wherein R represents a conjugated diene unit in the copolymer, R′ and R″ each represent hydrogen or an organic radical having from 1 to 18 carbon atoms and p and q each are an integer, the degree of dissociation in terms of p : q being in the range from 100 : 0 to 0 : 100,

B. one or more of alkali metal cations selected from Na^+, $K^+$and Li^+or quaternary ammonium cations represented by $R_1R_2N^+R_3R_4$ wherein R_1, R_2, R_3 and R_4 are the same or different and each selected from the group consisting of hydrogen, alkyl radical of from 1 to 18 carbon atoms, cycloalkyl radical and aryl radical, the amount being in the range from 0.5 to 5.0 equivalents, on the basis of the maleic acid derivative unit in the component (A);

C. Mg^{2+}ions in an amount from 0.5 to 2.0 equivalents, on the basis of the maleic acid derivative unit in the component (A);

D. anions of magnesium compound(s) or alkali metal compound(s), the amount being in the range from 0.5 to 7.0 equivalents, on the basis of the maleic acid derivative unit in the component (A); and

E. water in an amount in the range from 1 to 1000 times, the total weight of the componets (A), (B), (C) and (D), said composition being reversibly liquid at lower temperatures and solid at higher temperatures.

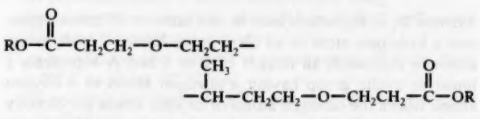
4,072,647

POLYVINYL CHLORIDE PLASTIC COMPOSITIONS

Ronald A. Schneider, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 569,508, April 18, 1975, Pat. No. 3,994,959.
This application June 16, 1976, Ser. No. 696,611
Int. Cl.[2] C08K *5/10*
U.S. Cl. 260—31.8 R **1 Claim**

1. Polyvinyl chloride plastic compositions containing a compound of the formula



wherein the R groups are primary alkyl of from 4 to 12 carbon atoms, in minor amounts sufficient to impart plasticizing properties.

4,072,648

HIGH TENSILE STRENGTH ELASTOMERIC ADHESIVE CEMENTS AND LAMINATES THEREFROM

Charles P. O'Farrell, Clark, and John J. Higgins, Westfield, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Division of Ser. No. 209,414, Dec. 17, 1971, Pat. No. 3,867,247. This application Sept. 12, 1974, Ser. No. 505,341
Int. Cl.[2] C08K *5/01, 5/05, 5/15;* C08L *9/00*
U.S. Cl. 260—33.4 PQ 7 Claims

1. A liquid adhesive elastomeric contact cement composition consisting of a sulfo derivative of an olefinically unsaturated butyl rubber having a viscosity average molecular weight of about 100,000 to about 450,000 containing between about 0.1 and about 5.0 mole percent of sulfo groups, and, as a tackifier, between about 5 and about 90 parts by weight of at least one organo thermoplastic resin having a softening or melting point of above 50° C., per hundred parts by weight of butyl rubber, dissolved in an organic solvent or mixture of organic solvents, said cement composition containing about 10 to about 50 weight % solids, said solvent or solvents being sufficiently volatile to substantially all evaporate at ambient temperatures and pressures.

4,072,649

PROCESS FOR THE PRODUCTION OF FOUNDRY CORES AND MOLDS

Rolf Kubens, Odenthal-Hahnenberg, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 7, 1975, Ser. No. 602,949
Claims priority, application Germany, Aug. 23, 1974, 2440375
Int. Cl.[2] C08K *3/34;* B22C *1/22;* B29C *1/02*
U.S. Cl. 260—37 N 10 Claims

1. In a process for the production of foundry cores and molds wherein a mixture of inert fillers, polyhydroxyl compounds, polyisocyanates and tertiary amines is cured in a mold, the improvement wherein at least 80% by weight of the polyisocyanate component used consists of polyisocyanates of the diphenyl alkane series which solely contain isocyanate groups sterically hindered by substituents in at least one ortho position.

4,072,650

FRICTION MATERIALS

John B. Littlefield, P.O. Box 243, Belle Haven, Va. 23306

Filed July 11, 1975, Ser. No. 594,953
Int. Cl.[2] C08K *3/10, 5/01*
U.S. Cl. 260—42.22 8 Claims

1. A friction material produced by molding a composition comprising:

A. an elastomer binder consisting of a copolymer of butadiene and styrene;
B. a granular filler
C. partially polymerized cashew nutshell oil resin;
D. at least one curing agent;
E. dicyclopentadienyliron, in sufficient quantity with respect to the binder to insure deposition of carbon at elevated temperatures and reduce the amount of decomposition products which cause fade.

4,072,651

TETRAMETAPHOSPHIMIC ACID AND DERIVATIVES AS FLAME RETARDANTS

David Francis Lawson, Akron, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Sept. 20, 1972, Ser. No. 290,588
Int. Cl.[2] C08K *9/00, 5/16;* C08L *7/00*
U.S. Cl. 260—42.44 9 Claims

1. A process for preparing a burn-resistant composition which comprises admixing between 0.2 and 20 parts by weight of tetrametaphosphimic acid or its salts with each 100 parts by weight of a burnable synthetic resin or natural material, the burn resistance of which is to be improved.

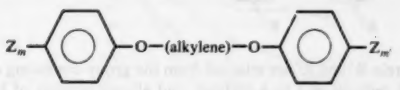
4,072,652

PLASTIC COMPOSITIONS

Arnold L. Anderson, Antioch, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 330,782, Feb. 8, 1973, Pat. No. 4,038,248. This application Jan. 6, 1976, Ser. No. 646,829
The portion of the term of this patent subsequent to July 26, 1984, has been disclaimed.
Int. Cl.[2] C08K *5/06*
U.S. Cl. 260—45.75 B 21 Claims

1. A plastic composition comprising a three component system consisting of (1) polyethylene polymer, (2) a bisphenoxy compound, which functions as a flame retardant for said composition, having the formula



wherein (a) Z is bromine; (b) *m* and *m'* are independent and are integers having a value of 5 and (c) alkylene is selected from the group consisting of $—(CH_2)—$, $—(CH_2)_2—$, and $—(CH_2)_3—$, and (3) a flame retardant enhancing agent.

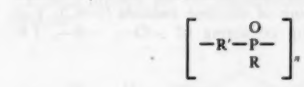
4,072,653

POLYMERIC PHOSPHINE OXIDE FLAME RETARDANTS

Kurt Moedritzer, Webster Groves, Mo., assignor to Monsanto Company, St. Louis, Mo.

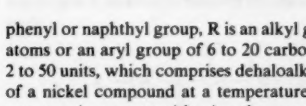
Filed May 20, 1976, Ser. No. 688,205
Int. Cl.[2] C08K *5/53;* C07F *9/02*
U.S. Cl. 260—45.7 P 9 Claims

1. The combination of an organic polymer together with a polyphosphine oxide corresponding to the formula

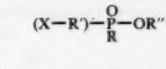


an alkyl group of 1 to 20 carbon atoms or an aryl group of 6 to 20 carbon atoms, R' is a phenylene or naphthylene group, and *n* is from 2 to 50 units.

9. Process for preparing polyphosphine oxides corresponding to the formula



phenyl or naphthyl group, R is an alkyl group of 1 to 20 carbon atoms or an aryl group of 6 to 20 carbon atoms, and *n* is from 2 to 50 units, which comprises dehaloalkylating in the presence of a nickel compound at a temperature of 50° C to 300° C a monomeric compound having the general formula



where X is chlorine or bromine, R is an alkyl group of 1 to 20 carbon atoms, or an aryl group of 6 to 20 carbon atoms, R' is phenylene or naphthylene and R'' is an alkyl group of 1 to 20 carbon atoms.

4,072,654

3-(4-ANILINOPHENOXY)-2-HYDROXYPROPYL SULFIDES, ETHERS AND AMINES AS ANTIOXIDANTS

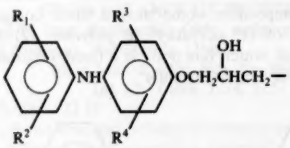
Richard H. Kline, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Dec. 17, 1976, Ser. No. 751,495
Int. Cl.[2] C08K *5/36, 5/18;* C07C *79/46, 69/34, 91/16, 91/06*
U.S. Cl. 260—45.9 QB 17 Claims

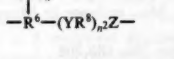
1. A compound having the following structural formula:

AZR

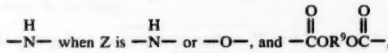
wherein A has the following structure:



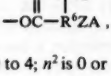
wherein R^1 and R^2 are selected from the group consisting of H, alkyl radicals of 1 to 4 carbons, and alkoxy radicals of 1 to 4 carbons; R^3 and R^4 are selected from the group consisting of H and alkyl radicals of 1 to 4 carbons (1–4C); R is selected from the group consisting of alkyl radicals (1–20C), phenyl or alkyl-substituted phenyl radicals, aralkyl radicals (7–12C); an acyloxyalkyl of the structure $—CH_2(CH_2)_nCOOR^5$, wherein R^5 is an alkyl (1–4C) and n is 0 or 1, the group A, and the group XA wherein X is a moiety of the structure



wherein R^6 is selected from the group consisting of alkylene radicals (1–6C), cycloalkylene radicals (5–12C) and $—R^{11}—R^{10}—(R^{12})_n3$ wherein R^{10} is a cycloalkylene (5–12C), R^{11} and R^{12} are alkylene radicals (1–6C) and n^3 is 0 or 1, R^7 is selected from the group consisting of alkyl radicals (1–4C); R^8 is selected from the group consisting of alkylene radicals (1–6C); Y is selected from the group consisting of —O—, —S—, 1,4-phenylene,

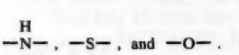


wherein R^9 is an alkylene radical (2–6C) which may be substituted by the group



n^1 is 0 to 4; n^2 is 0 or 1 with the proviso that when Y and Z are both

or both —O— then n^2 can be 0–6, and Z is selected from the group consisting of



9. A diene polymer susceptible to oxidative degradation having incorporated therein a compound according to claim 1.

4,072,655

ORGANOSILICON COMPOUNDS AS ADDITIVES FOR CURABLE ORGANOPOLYSILOXANE COMPOSITIONS

Eckhart Louis, Burghausen; Norman Dorsch, Fuchshausen, and Ernst Wohlfarth, Burghausen, all of Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Jan. 12, 1976, Ser. No. 648,429
Claims priority, application Germany, Jan. 15, 1975, 2501441
Int. Cl.[2] C08G *77/04*
U.S. Cl. 260—46.5 G 9 Claims

1. In an improved composition which is stable in the absence of moisture, but when exposed to moisture cures to a solid comprising a diorganopolysiloxane having terminal condensable groups, an organosilicon cross-linking agent having at least 3 groups per molecule selected from the class consisting of amino radicals, acylated amino radicals and oximo radicals, said amino radicals and acylated amino radicals are linked to the silicon atom via a nitrogen atom and said oximo radicals are linked to a silicon atom via an oxygen atom, the improvement which comprises that said composition also contains an organosilicon compound in which at least 75 percent of the number of silicon atoms are linked via an oxygen atom to a hydrocarbon radical in which the hydrocarbon radical is linked to one or two hydroxyl groups and the hydrocarbon radical may be linked to the same or different silicon atom via an oxygen atom.

4,072,656

GLYCIDYL ETHERS DERIVED FROM 3,3',5,5'-TETRAALKYL-4,4'-DIHYDROXYBIPHENYL

Ludwig A. Hartmann, Wilmington, Del., assignor to ICI Americas Inc., Wilmington, Del.

Filed May 24, 1976, Ser. No. 689,157
Int. Cl.[2] C08G *59/24*
U.S. Cl. 260—47 EN 4 Claims

1. A curable mixture comprising a glycidyl ether which is the condensation product of a halohydrin and 3,3',5,5'-tetramethyl-4,4'-dihydroxybiphenyl and a curing agent selected from the class consisting of methylene dianiline and m-phenylene diamine.

4,072,657

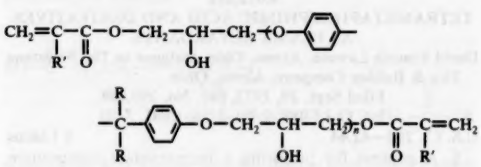
RESIN COMPOSITE FOR PAINT CURABLE BY HIGH ENERGY IONIZING RADIATION

Tadashi Tanaka; Akira Okamoto, both of Yokohama; Takashi Kouno, Machida, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation of Ser. No. 301,250, Oct. 26, 1972, abandoned.
This application Aug. 21, 1975, Ser. No. 606,606
Claims priority, application Japan, Oct. 26, 1971, 46-85013
Int. Cl.[2] C08F *220/20*
U.S. Cl. 260—47 UA 1 Claim

1. A non-volatile resin composite for paint curable in the air by high energy ionizing radiation which comprises:

A. a prepolymer having a terminal active double bond at both terminals, the molecular weight per each of said double bonds being greater than 300, said prepolymer being of the formula



wherein n is an integer of from 2 to 6,
R′ is H or $-CH_3$, and
R is —H or $-CH_3$, and

B. a non-volatile polyfunctional polyester oligomer having two or more terminal active double bonds at the terminals and a molecular weight of less than 1000, the molecular weight per each of said double bonds being less than 500, prepared by further esterifying the end of an ester of at least one unsaturated and/or saturated polybasic carboxylic acid with an acid selected from the group consisting of acrylic acid and methacrylic acid, and

the terminal double bond equivalent ratio of A to B being in the range of 5 to 0.5.

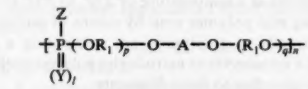
4,072,658

NOVEL PHOSPHORUS- AND BROMINE-CONTAINING POLYMERS

Kazuo Okamoto, Osaka, and Hiroshi Uchio, Settsu, both of Japan, assignors to Kanebo, Ltd., Tokyo, Japan

Filed May 15, 1975, Ser. No. 578,033
Claims priority, application Japan, May 18, 1974, 49-55706; Jan. 8, 1975, 50-5136
Int. Cl.² C08G 65/40, 79/04
U.S. Cl. 260—49 **15 Claims**

1. A polymer having the formula

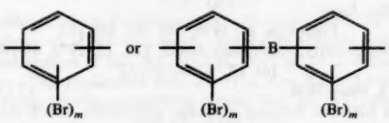


(III)

wherein R_1, A, Z, Y, l, p and q have the same meanings as defined hereinafter and n is 3 to 40, obtained by reacting, in the liquid phase, at least one bromine-containing compound having the formula (I)

$$H(OR_1)_pOAO(R_1O)_qH \quad (I)$$

wherein R_1 is alkylene having 2 or 3 carbon atoms, p and q are integers of at least 1 and the sum of p and q is an integer of not more than 4 and A is



wherein m is an integer of one to 4 and B is alkylene or alkylidene having one to 6 carbon atoms or sulfone, with at least one phosphorus halide compound having the formula (II)

(II)

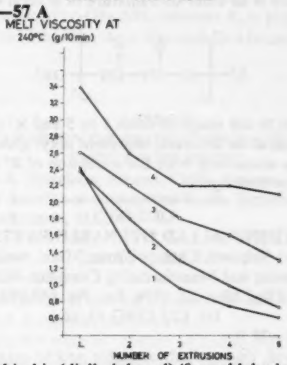
wherein Z is $-R_2$ or $-OR_2$, R_2 is alkyl or aryl, X is chlorine or bromine, Y is sulfur or oxygen and l is zero or 1, wherein the molar ratio of the formula (I) compound:formula (II) compound is 1.0:0.9 to 1.5 and wherein the reaction temperature is from zero to 180° C.

4,072,659

4,4′-THIO-BIS-(DIALKYLPHENOL)/FORMALDEHYDE CONDENSATES AND PROCESS FOR PRODUCING THEM

Hans Feichtinger, Dinslaken; Siegfried Lutze, Gelsenkirchen; Hans-Walter Birnkraut, Oberhausen, and Werner Kluy, Bochum-Stiepel, all of Germany, assignors to Ruhrchemie AG, Oberhausen, Germany

Filed May 5, 1975, Ser. No. 574,811
Claims priority, application Germany, May 17, 1974, 2424201
Int. Cl.² C08G 8/12
U.S. Cl. 260—57 A **13 Claims**



1. A 4,4′-thio-bis-(dialkylphenol)/formaldehyde condensation product having a molecular weight of 1,000 to 4,000.

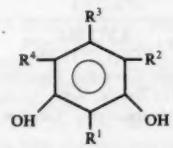
4,072,660

PROCESS FOR THE MANUFACTURE OF RESORCINOLS

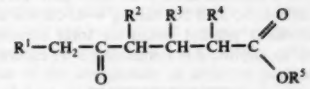
Werner Heinrich Muller, Aldersbach; Hansjörg Hey, Hofheim, Taunus, both of Germany, and Tomas Weil, Sao Paulo, Brazil, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 28, 1976, Ser. No. 709,291
Claims priority, application Germany, July 30, 1975, 2533920
Int. Cl.² C07C 39/08, 39/06, 43/22
U.S. Cl. 260—621 H **8 Claims**

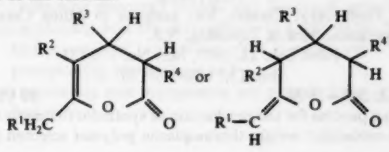
1. In a process for the manufacture of resorcinols of the formula



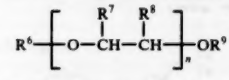
in which the radicals R^1 to R^4, which may be identical or different, represent hydrogen, alkyl groups having up to 12 carbon atoms, R^1 and R^2 can additionally represent alkoxy groups having up to 4 carbon atoms or aryl groups having up to 10 carbon atoms and R^3 can additionally represent a cyano group or carbalkoxy group having up to 6 carbon atoms, by reacting in a first step 4-oxo-carboxylic acid esters of the formula



in which the radicals R^1 to R^4 have the aforesaid meaning and R^5 is an alkyl radical having up to 6 carbon atoms, or δ-enollactones of the formula



in which R^1 to R^4 have the aforesaid meaning, with a strong base selected from the alkali and alkaline earth metals and their alcoholates, oxides, amides and hydroxides to form a cyclohexane dione and in a second step dehydrogenating said cyclohexane dione under a pressure of from 0.1 to 20 atmospheres at a temperature of from 150° to 350° C. in the presence of a catalyst containing a noble metal of the 8th subgroup of the Periodic Table to form said resorcinol, the improvement which comprises carrying out both of said steps without intermediate isolation of said cyclohexane dione in a solvent solution of a solvent which is an ether or a mixture of several ethers of the formula



in which n is in the range of from 1 to 5 and R^6 to R^9, which may be identical or different, represent alkyl groups having 1 to 12 carbon atoms and, with the exception of R^6 and R^9, may also represent hydrogen.

4,072,661
THIN-WALLED OVENABLE PARTS

Gene Herbert Shipman, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 22, 1976, Ser. No. 668,912
Int. Cl.² C08G *63/16*
U.S. Cl. 260—75 R **3 Claims**

1. A shaped, thin-walled, ovenable article prepared by the electrostatic deposition of a composition containing, in addition to optionally present inert filler, not less than 80 percent by weight of polybutylene terephthalate and effective amounts of both a stabilizer and an antioxidant, the sum of the amounts of stabilizer and antioxidant therein being not more than about one percent by weight, said composition having
   1. a melt flow factor of about 20 grams per 10 minutes or greater,
   2. a crystallization rate factor (t_{50}) of about 1–3 minutes,
   3. a linear thermal contraction factor of 0.015–0.025 cm/cm,
   4. a logarithmic viscosity number greater than 0.6,
   5. a heat deflection resistance factor of about 100°–200° C at 4.6 kg per square centimeter fiber stress,
   6. a m.p. of 220°–230° C and
   7. a glass transition temperature (T_g) in the range of 20°–40° C.

4,072,662
POLYESTERS

Robert van der Linde; Gerardus Franciscus Meijerink, and Johan Rietberg, all of Zwolle, Netherlands, assignors to Internationale Octrooi Maatschappij "Octropa" B.V., Rotterdam, Netherlands

Filed July 6, 1976, Ser. No. 703,024
Claims priority, application United Kingdom, July 4, 1975, 28310/75
Int. Cl.² C08G *63/12*
U.S. Cl. 260—75 R **7 Claims**

1. A method for preparing a polyester having an acid value below 15 and a hydroxyl value of 130–400, comprising heating and reacting a mixture consisting essentially of 75–100 equivalent percent of a phthalic acid, 0–25 equivalent percent of an aliphatic dicarboxylic acid containing 4–40 carbon atoms and 150–225 equivalent percent based on total carboxylic acid equivalents of an aliphtic diol containing 5–12 carbon atoms in the molecule.

4,072,663
TRANSFER SYSTEM FOR CONVEYING POLYESTER POLYMER

David Pendlebury, Chester, Va., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Feb. 22, 1977, Ser. No. 770,731
Int. Cl.² C08G *63/70*
U.S. Cl. 260—75 M **10 Claims**

1. In a process for the production of synthetic filaments from a high-molecular weight thermoplastic polymer selected from the group consisting of polyester polymers by melt-spinning, which polymers are subject to thermal decomposition at temperatures above about 270° C., including the steps of supplying a melt of said polymer from a polymer source, and transferring the polymer melt by means of pumps and transfer lines to a melt-spinning system, the improvement which comprises:
   a. continuously supplying said polymer melt at a temperature of 270° to 300° C. and at a rate between 100 and 10,000 pounds per hour to a screw pump, said polymer melt having an intrinsic viscosity of 0.85 to 1.05;
   b. pumping said polymer melt by means of said screw pump through a first pipe zone to a gear pump, the pipe in said first pipe zone being sized so that the rate of flow of the polymer melt in the pipe is maintained in accordance with the limit formula:

$$D_1 = K_1 (Q_1)^{\frac{1}{3}}$$

   where Q_1 is the rate of flow of polymer melt in the pipe in pounds per hour, D_1 is the inside diameter of the pipe in inches, and K_1 is 0.310 0.380, said polymer melt being maintained at a temperature of 270° to 300° C.;
   c. then pumping said polymer melt by means of said gear pump through a second pipe zone to a metering pump, the pipe in said second pipe zone being sized so that the rate of flow of the polymer melt is maintained in accordance with the limit formula:

$$D_2 = K_2 (Q_2)^{\frac{1}{3}}$$

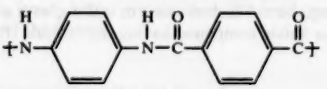
   where Q_2 is the rate of flow of the polymer melt in the pipe in pounds per hour, D_2 is the inside diameter of the pipe in inches, and K_2 is about 0.230 to 0.290; said polymer melt being maintained at a temperature of 270° to 300° C.; and
   d. then pumping said polymer melt by means of said metering pump directly to a spinning pot comprising a filter medium and a spinnerette to extrude the polymer melt into a quenching chamber to form filaments.

4,072,664
AROMATIC POLYAMIDES FROM N,N'-BIS(P-AMINOBENZOYL)ETHYLENE DIAMINE

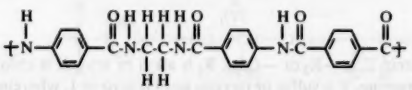
Tuyoshi Konomi; Seiji Endo; Masayasu Yamaguchi, and Kenichi Katsuo, all of Ootsu, Japan, assignors to Toyobo Co., Ltd., Osaka, Japan

Filed Feb. 14, 1975, Ser. No. 550,112
Claims priority, application Japan, Feb. 15, 1974, 49-18736
Int. Cl.² C08G *69/32*
U.S. Cl. 260—78 R **17 Claims**

1. A filament forming aromatic polyamide which consists essentially of (1) a unit of the formula:



and (2) a unit of the formula:



the amount of the unit (2) being from about 0.6 to 50 mol% on the basis of the combined amount of the units (1) and 2).

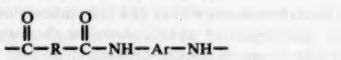
4,072,665

POLYAMIDE FROM ARYLENE DIAMINE, ISOPHTHALIC ACID AND ALKYLENE DICARBOXYLIC ACID

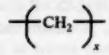
Besir K. Onder, North Haven, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Mar. 8, 1976, Ser. No. 664,764
Int. Cl.[2] C08G *69/26*
U.S. Cl. 260—78 R 6 Claims

1. A fiber forming copolyamide consisting essentially of the recurring unit



wherein R in 60 to 85 percent of the recurring units is



wherein *x* represents an integer from 7 to 12 inclusive and in 15 to 40 percent of the recurring units R is m-phenylene, and Ar is 4,4'-methylenediphenylene.

4,072,666

ISOLATION OF CYSTOPLASMIC PROTEINS USING CHITOSAN

Marc Horisberger, Mont-Pelerin, Switzerland, and Mats Olofsson, Astorp, Sweden, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed Nov. 13, 1975, Ser. No. 631,474
Claims priority, application United Kingdom, Nov. 15, 1974, 49494/74
Int. Cl.[2] A23J *1/14*
U.S. Cl. 260—112 R 8 Claims

1. A process for isolating cytoplasmic proteins from aqueous vegetable materials containing chloroplastic and cytoplasmic proteins which comprises adding chitosan to the vegetable material at a temperature of 10° to 20° C to form a flocculate of the chloroplastic proteins and a supernatant in which the cytoplasmic proteins are retained, separating the flocculate and separating a fraction containing the cytoplasmic proteins from the supernatant.

4,072,667

PROCESS FOR RECOVERING MICROBIAL CELLULAR PROTEINS

Masahiko Ishida; Yoshitaka Oguri; Norio Shimizu, and Tadashi Muroi, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Continuation of Ser. No. 316,896, Dec. 20, 1972, abandoned.
This application Nov. 21, 1974, Ser. No. 525,928
Claims priority, application Japan, Dec. 22, 1971, 46-103683
Int. Cl.[2] A23J *1/18*
U.S. Cl. 260—112 R 35 Claims

1. A process for recovering with high purity substantially all of the different microbial cellular proteins having different physico-chemical properties from a solution obtained by extracting microbial cells with an aqueous extraction solution, comprising (1) contacting the solution with a strong cation exchanger at a pH value of less than 4.5 thereby adsorbing the proteins onto said cation exchanger, the cation exchanger being sufficiently swollen by water so that ions of the proteins can easily arrive at exchanging groups present in the cation exchanger, and (2) desorbing the proteins adsorbed by said strong cation exchanger by contacting said cation exchanger with a volatile basic substance in the presence of water to thereby recover substantially all of said different proteins with high purity.

4,072,668

LH-RH ANALOGS

Max S. Amoss, Carlsbad; Michael W. Monahan, San Diego, and Wylie W. Vale, Jr., La Jolla, all of Calif., assignors to The Salk Institute for Biological Studies, San Diego, Calif.

Continuation-in-part of Ser. No. 413,314, Nov. 6, 1973, abandoned. This application Sept. 27, 1974, Ser. No. 509,835
Int. Cl.[2] C07C *103/52;* A61K *37/00*
U.S. Cl. 260—112.5 LH 7 Claims

1. A peptide which influences the release of gonadotropins by the pituitary gland, said peptide being pGlu-R_1-Trp-Ser-Tyr-R_2-Leu-Arg-Pro-Gly-NH_2 wherein R_1 is either deleted or selected from His, Gly, Asp, Cys and D-Ala and R_2 is D-Ala.

4,072,669

PREPARATION OF PROTEIN ISOLATES FROM SAFFLOWER SEEDS

Antoinette A. Betschart, Albany, Calif., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Mar. 7, 1977, Ser. No. 775,227
Int. Cl.[2] A23J *1/14*
U.S. Cl. 260—123.5 4 Claims

1. A process for preparing a protein isolate from safflower seeds, which comprises the steps of

a. pressing the seeds to remove oil and to form a press-cake,
b. extracting the press-cake with hexane at 20°–30° C. to remove residual oil,
c. separating the press-cake from the hexane,
d. drying the press-cake at 20°–30° C.,
e. applying an aqueous alkalizer to the press-cake at a pH of 8 to 10,
f. separating a juice containing soluble proteins therefrom,
g. acidifying the juice to pH 6.0 to precipitate a protein isolate,
h. separating the protein isolate therefrom, and
i. washing the protein isolate with water at pH 6.0 and drying it.

4,072,670

LOY PHYTATE ISOELECTRIC PRECIPITATED SOY PROTEIN ISOLATE

Kenneth C. Goodnight, Jr.; Grant H. Hartman, Jr., and Robert F. Marquardt, all of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Filed Oct. 26, 1976, Ser. No. 735,489
The portion of the term of this patent subsequent to Nov. 30, 1993, has been disclaimed.
Int. Cl.[2] A23J *1/14*
U.S. Cl. 260—123.5 24 Claims

1. The process for preparing a soy protein isolate having low phytate content which comprises in sequence the steps of:

(a) forming an aqueous solution of soy protein having a pH within the range of pH 10.6 to pH 14 at a temperature in the range of 10°–50° C. during a period sufficient to render phytates and phytic acid insoluble but insufficient to degrade said soy protein, said soy protein being obtained by aqueous extraction at a pH in excess of the isoelectric value of the soy protein of defatted particulate soybean which has not previously been treated with acid;
(b) separating insoluble material including phytates and phytic acid from said solution to yield a clarified extract containing dissolved protein and dissolved carbohydrate;
(c) acidifying acid clarified extract to a pH within the isoelectric range of from about pH 4 to about pH 5 thereby precipitating soy protein; and
(d) separating said precipitated soy protein from said clarified extract.

4,072,671

METHOD FOR EXTRACTING PHENOLS AND OLIGOSACCHARIDES FROM VEGETABLE TISSUES

Giancarlo Sodini, and Marco Canella, both of Rome, Italy, assignors to Snamprogetti, S.p.A., San Donato Milanese, Italy

Filed Feb. 20, 1976, Ser. No. 659,749

Claims priority, application Italy, Jan. 14, 1976, 19240/76; Feb. 21, 1975, 20504/75

Int. Cl.[2] A23J *3/00;* A23L *1/20, 1/36*

U.S. Cl. 260—123.5 10 Claims

1. A method for the extraction of phenols and oligosaccharides from vegetable protein materials containing said phenols and oligosaccharides consisting in extracting said protein materials selected from the group consisting of flours, concentrates and isolates with an extracting amount of a polar solvent consisting of n-butyl alcohol in miscible combination with an aqueous solution of an electrolyte having an acidic nature selected from the group consisting of organic or inorganic acids and the acidic salts thereof.

4,072,672

CATIONIC DYES CONTAINING AN ARYLOXY GROUP LINKED THROUGH A BRIDGING RADICAL TO A QUATERNIZED NITROGEN ATOM

Beat Henzi, Nevallschwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

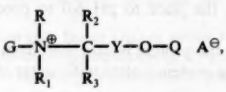
Continuation of Ser. No. 383,878, July 30, 1973, abandoned. This application Nov. 28, 1975, Ser. No. 635,600

Claims priority, application Switzerland, July 31, 1972, 11354/72; Dec. 7, 1972, 17824/72; Feb. 5, 1973, 1618/73; Feb. 21, 1973, 2523/73

Int. Cl.[2] C09B *29/06, 29/10, 29/24*

U.S. Cl. 260—205 62 Claims

1. A dye of the formula



wherein

G is the residue of a carbocyclic monoazo dye

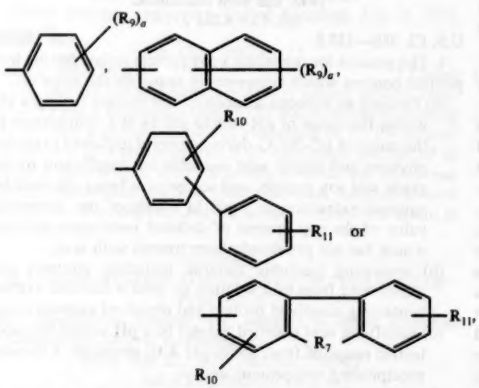
R is alkyl of 1 to 4 carbon atoms, alkyl of 1 to 4 carbon atoms substituted by hydroxy or phenyl, amino or alkoxy of 1 to 4 carbon atoms,

R_1 is alkyl of 1 to 4 carbon atoms or alkyl of 1 to 4 carbon atoms substituted by hydroxy or phenyl,

R_2 is hydrogen or alkyl of 1 to 4 carbon atoms,

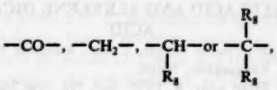
R_3 is hydrogen or alkyl of 1 to 4 carbon atoms,

Q is



wherein n

R_7 is



wherein each R_8 is independently alkyl of 1 to 4 carbon atoms,

each R_9 is independently hydroxy, halo, alkyl of 1 to 4 carbon atoms, alkyl of 1 to 4 carbon atoms substituted by halo, hydroxy, cyano, phenyl or phenoxy, alkoxy of 1to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms substituted by halo, hydroxy, cyano, phenyl or phenoxy, cycloalkyl of 5 or 6 carbon atoms, cycloalkyl of 5 or 6 carbon atoms substituted by alkyl of 1 to 4 carbon atoms, trifluoromethyl, cyano, nitro, phenoxy, naphthyloxy, -CO-Ro, —CO-O-Ro, —O-CO-Ro, —CO-NH-Ro, —CO-N(Ro)$_2$, —O-CO-N(Ro)$_2$, -NH-CO-Ro, —SO_2-Ro, -SO_2-NH-Ro or -O-SO_2-N(Ro)$_2$, wherein each Ro is independently alkyl of 1 to 4 carbon atoms or phenyl,

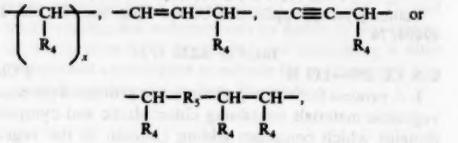
R_{10} is hydrogen, halo or alkyl of 1 to 4 carbon atoms,

R_{11} is hydrogen alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, phenyl, phenoxy, halo, trifluoromethyl, nitro, cyano, -CO-Ro, —CO-O-Ro, —O-CO-Ro, —CO-NH-Ro, —NH-CO-Ro, -SO_2-Ro —SO_2—NH-Ro or -SO_2-N)Ro)$_2$,

wherein each Ro is independently alkyl of 1 to 4 carbon atoms or phenyl, and

a is 0, 1, 2, 3, 4, or 5, with the proviso that when a is 4 or 5 each R_9 must be halo,

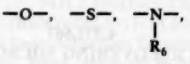
Y is



wherein each

R_4 is independently hydrogen or alkyl of 1 to 4 carbon atoms,

R_5 is



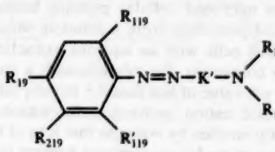
—SO—, —SO_2—or —CO—, wherein R_6 is hydrogen or alkyl of 1 to 4 carbon atoms, and

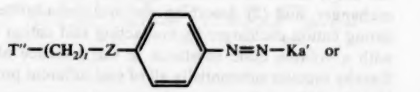
x is 1 to 6, and

A^- is an anion,

wherein each halo is independently chloro, bromo or iodo, with the proviso that the molecule is free of sulfo groups.

8. A compound of the formula





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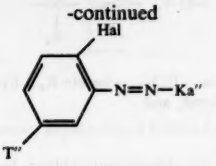
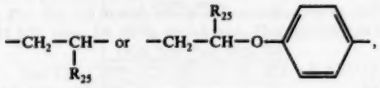


wherein

R_{16} is hydrogen, phenyl, alkyl of 1 to 4 carbon atoms or alkyl of 1 to 4 carbon atoms substituted by halo, hydroxy, cyano, phenyl, phenoxy, alkoxycarbonyl wherein the alkoxy moiety has 1 to 4 carbon atoms, alkylcarbonyloxy wherein the alkyl moiety has 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, benzoyloxy, —CO-N-$(Ra)_2$ or —O-CO-$N(Ra)_2$, wherein each Ra is independently hydrogen or alkyl of 1 to 4 carbon atoms,

R_{17} is



wherein R_{25} is hydrogen or alkyl of 1 to 4 carbon atoms,

R_{19} is hydrogen, nitro, halo, cyano, trifluoromethyl, alkylsulfonyl of 1 to 4 carbon atoms, phenylsulfonyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, -CO-Ro, —COORo, —CO—NHRo or -SO_2-$N(R_{21})_2$,

wherein each R_{21} is independently alkyl of 1 to 4 carbon atoms, and

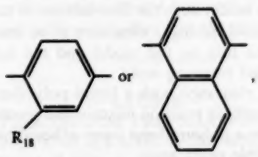
Ro is alkyl of 1 to 4 carbon atoms or phenyl,

each of

R_{119} and R'_{119} is independently hydrogen, nitro, halo, cyano, alkyl of 1 to 4 carbon atoms, trifluoromethyl, alkylsulfonyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms,

R_{219} is hydrogen, halo, nitro or cyano, with the proviso that at least one of R_{19}, R_{119}, R'_{119} and R_{219} is hydrogen or halo

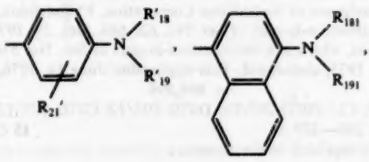
K′ is



wherein

R_{18} is hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or halo,

Ka′ is



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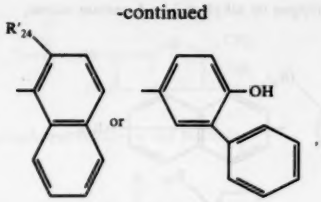
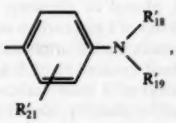


wherein each of R_{18}′ and R_{19}′ is independently hydrogen, phenyl, cyclohexyl, alkyl of 1 to 4 carbon atoms or alkyl of 1 to 4 carbon atoms substituted by alkoxycarbonyl wherein the alkoxy moiety has 1 to 4 carbon atoms, benzoyloxy, phenoxy, halo, hydroxy, cyano, alkoxy of 1 to 4 carbon atoms, alkylcarbonyloxy wherein the alkyl moiety has 1 to 4 carbon atoms or N,N-dialkylamino wherein each alkyl independently has 1 to 4 carbon atoms, with the proviso that when one of R_{18}′ and R_{19}′ is phenyl or cyclohexyl, the other is other than phenyl or cyclohexyl, R_{21}′ is hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or halo, R_{24}′ is hydroxy, amino or anilino, and

each of

R_{181} and R_{191} is independently hydrogen, phenyl, cyclohexyl, alkyl of 1 to 4 carbon atoms or alkyl of 1 to 4 carbon atoms substituted by alkoxycarbonyl wherein the alkoxy moiety has 1 to 4 carbon atoms, benzoyloxy, phenoxy, halo, hydroxy, cyano, alkoxy of 1 to 4 carbon atoms, alkylcarbonyloxy wherein the alkyl moiety has 1 to 4 carbon atoms or N,N-dialkylamino wherein each alkyl independently has 1 to 4 carbon atoms, with the proviso that at least one of R_{181} and R_{191} is hydrogen or alkyl of 1 to 4 carbon atoms,

Ka″ is



wherein each of

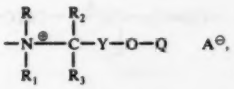
R_{18}′ and R_{19}′ is independently hydrogen, phenyl, cyclohexyl, alkyl of 1 to 4 carbon atoms or alkyl of 1 to 4 carbon atoms substituted by alkoxycarbonyl wherein the alkoxy moiety has 1 to 4 carbon atoms, benzoyloxy, phenoxy, halo, hydroxy, cyano, alkoxy of 1 to 4 carbon atoms, alkylcarbonyloxy wherein the alkyl moiety has 1 to 4 carbon atoms or N,N-dialkylamino wherein each alkyl independently has 1 to 4 carbon atoms, with the proviso that when one of R_{18}′ and R_{19}′ is phenyl or cyclohexyl, the other is other than phenyl or cyclohexyl, and

R_{21}′ is hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms or halo,

Z is —CO- or —SO_2,

t is 1 or 2, Hal is halo, and

T″ is



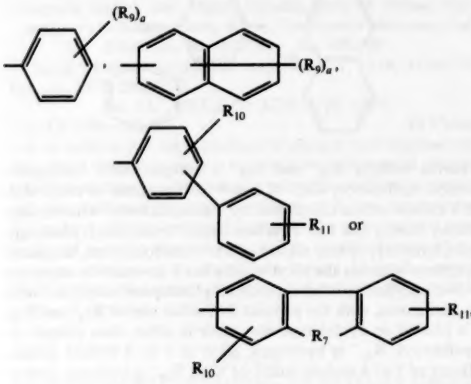
wherein

R is alkyl of 1 to 4 carbon atoms, alkyl of 1 to 4 carbon atoms substituted by hydroxy or phenyl, amino or alkoxy of 1 to 4 carbon atoms,

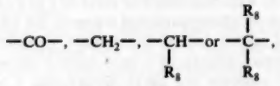
R_1 is alkyl of 1 to 4 carbon atoms or alkyl of 1 to 4 carbon atoms substituted by hydroxy or phenyl,

R_2 is hydrogen or alkyl of 1 to 4 carbon atoms,

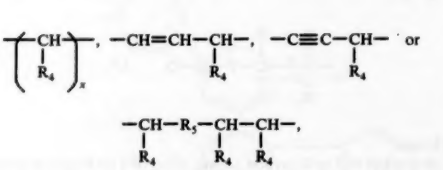
R_3 is hydrogen or alkyl of 1 to 4 carbon atoms,
Q is



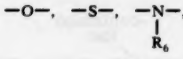
wherein R_7 is



wherein each
R_8 is independently alkyl of 1 to 4 carbon atoms,
each
R_9 is independently hydroxy; halo; alkyl of 1 to 4 carbon atoms; alkyl of 1 to 4 carbon atoms substituted by halo, hydroxy, cyano, phenyl or phenoxy; alkoxy of 1 to 4 carbon atoms; alkoxy of 1 to 4 carbon atoms substituted by halo, hydroxy, cyano, phenyl or phenoxy; cycloalkyl of 5 or 6 carbon atoms; cycloalkyl of 5 or 6 carbon atoms substituted by alkyl of 1 to 4 carbon atoms; trifluoromethyl; cyano; nitro; phenoxy; naphthyloxy; —CO—Ro; —CO—O—Ro; —O—CO—Ro; —CO—NH—Ro; —CO—$N(Ro)_2$; —O—CO—$N(Ro)_2$; —NH—CO—Ro; —SO_2—Ro; —SO_2—NH—Ro or —O—SO_2—$N(Ro)_2$,
wherein each
Ro is independently alkyl of 1 to 4 carbon atoms or phenyl,
R_{10} is hydrogen, halo or alkyl of 1 to 4 carbon atoms,
R_{11} is hydrogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, phenyl, phenoxy, halo, trifluoromethyl, nitro, cyano, —CO—Ro, —CO—O—Ro, —O—CO—Ro, —CO—NH—Ro, —NH—CO—Ro, —SO_2—Ro, —SO_2—NH—Ro or —SO_2—$N(Ro)_2$,
wherein each Ro is independently alkyl of 1 to 4 carbon atoms or phenyl, and
a is 0, 1. 2, 3, 4, or 5, with the proviso that when *a* is 4 or 5 each R_9 must be halo,
Y is

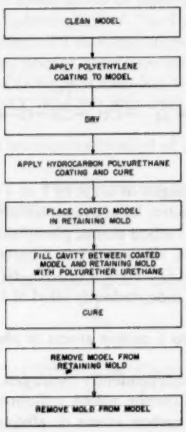


wherein each
R_4 is independently hydrogen or alkyl of 1 to 4 carbon atoms,
R_5 is



—SO—, —SO_2— or —CO—, wherein R_6 is hydrogen or alkyl of 1 to 4 carbon atoms, and
x is 1 to 6, and
A^- is an anion,
wherein each halo is independently chloro, bromo or iodo.

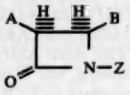
4,072,673
METHOD FOR MAKING A FLEXIBLE MOLD
Peter C. Lammers, Doylestown, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Continuation of Ser. No. 873,656, Nov. 3, 1969, abandoned. This application Nov. 8, 1971, Ser. No. 196,754
Int. Cl.[2] B29C *5/00;* B29D *9/08*
U.S. Cl. 264—225 **2 Claims**


CLEAN MODEL
APPLY POLYETHYLENE COATING TO MODEL
DRY
APPLY HYDROCARBON POLYURETHANE COATING AND CURE
PLACE COATED MODEL IN RETAINING MOLD
FILL CAVITY BETWEEN COATED MODEL AND RETAINING MOLD WITH POLYURETHER URETHANE
CURE
REMOVE MODEL FROM RETAINING MOLD
REMOVE MOLD FROM MODEL

1. A method of making a flexible mold comprising the steps of
1. forming a film of a hydrocarbon polyurethane of about 10–100 mils in thickness on a model, said hydrocarbon polyurethane comprising the reaction product of a hydrocarbon polyol and an organic polyisocyanate,
2. placing the model with the film thereon in the cavity of a retaining mold having a clearance of at least 0.1 inches between the film on the model and the surface of the cavity of said retaining mold,
3. filling said clearance with a liquid polyetherurethane or polyesterurethane reaction mixture and reacting said mixture to form a polyurethane layer adhered to said film to form a flexible mold, and
4. removing the mold from the retaining mold and model.

4,072,674
CIS-4-OXOAZETIDINE INTERMEDIATES AND METHODS OF PREPARING THEM
John Gerald Gleason, Delran; Kenneth George Holden, Haddonfield, both of N.J., and William Francis Huffman, Malvern, Pa., assignors to SmithKline Corporation, Philadelphia, Pa.
Continuation-in-part of Ser. No. 626,686, Oct. 29, 1975, abandoned, which is a continuation-in-part of Ser. No. 574,225, May 5, 1975, abandoned. This application June 14, 1976, Ser. No. 696,094
Int. Cl.[2] C07D *205/08;* D07D *403/12;* C07D *409/12*
U.S. Cl. 260—239 A **15 Claims**

1. A compound of the structure:



in which:

A is azido, amino, acylamino or blocked amino;

B is —COOY;

Y is hydrogen, lower alkyl, benzyl, methoxybenzyl or 2,2,2-trichloroethyl;

and Z is hydrogen, 2,4-dimethoxybenzyl, benzhydryl or methoxy substituted benzhydryl, said acylamino being any pharmaceutically acceptable group present at the 7-position of known cephalosporins.

4,072,675
N-PHENYL AMIDINES

Yao Hua Wu, and Walter G. Lobeck, Jr., both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Continuation of Ser. No. 466,753, May 3, 1974, abandoned, which is a continuation-in-part of Ser. No. 255,701, May 22, 1972, Pat. No. 3,816,454, which is a continuation-in-part of Ser. No. 47,589, June 18, 1970, abandoned. This application Oct. 24, 1975, Ser. No. 625,796

Int. Cl.[2] **C07D** *207/22, 211/72, 223/12, 405/12*

U.S. Cl. 260—239 BE **23 Claims**

1. A compound selected from the group consisting of:

2-(N-phenylbenzylamino)-1-pyrroline,

5-methyl-2-(N-phenylbenzylamino)-1-pyrroline,

5,5-dimethyl-2-(N-phenylbenzylamino)-1-pyrroline,

2-[N-(m-trifluoromethylphenyl)benzylamino]-1-pyrroline,

2-[3,4-dichloro-N-(2-thenyl)anilino]-5-methyl-1-pyrroline,

5,5-dimethyl-2-[N-(m-trifluoromethylphenyl)benzylamino]-1-pyrroline,

3,4,5,6-tetrahydro-2-(N-phenylbenzylamino)pyridine,

3,4,5,6-tetrahydro-7-(N-phenylbenzylamino)-2H-azepine,

2-[N-(o-methoxyphenyl)benzylamino]-1-pyrroline,

2-[N-(3,4-dichlorophenyl)benzylamino]-1-pyrroline,

5-methyl-2-[N-(m-trifluoromethylphenyl)benzylamino]-1-pyrroline,

2-(N-phenylphenethylamino)-1-pyrroline,

5-methyl-2-(phenylphenethylamino)-1-pyrroline,

5,5-dimethyl-2-(N-phenylphenethylamino)-1-pyrroline,

3,4,5,6-tetrahydro-7-[(N-phenyl)phenethylamino]-2H-azepine,

2-(3-chloro-N-furfurylanilino)-5,5-dimethyl-1-pyrroline,

and pharmaceutically acceptable salts thereof.

4,072,676
PROCESS FOR PREPARATION OF 6-AMINOPENICILLANIC ACID DERIVATIVES

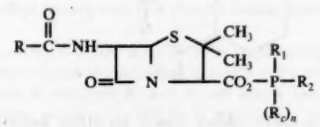
John H. Sellstedt, Pottstown, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Feb. 15, 1974, Ser. No. 442,954

Int. Cl.[2] **C07D** *499/04*

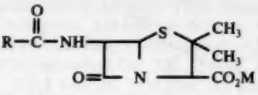
U.S. Cl. 260—239.1 **5 Claims**

1. A process for the preparation of a compound of the formula:



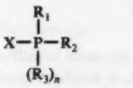
I

which comprises reacting a compound of the formula:



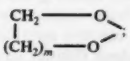
II

with a phosphorus halide of the formula:



III

in a molar ratio of about 0.5:1 to 3:1 and at a temperature of between about −40° C and about +10° C; wherein R is selected from the class consisting of benzyl, phenoxymethyl, n-heptyl, 2-pentyl, n-amyl, p-hydroxybenzyl and p-aminobenzyl; M is selected from the class consisting of hydrogen, an alkali metal and a tertiary amine; X is halogen; R_1 and R_2 are members selected from the class consisting of C_1 through C_7 (lower)alkoxy, aryl(lower)alkyloxy, aryloxy and halogen; R_1 and R_2 when joined together are



R_3 is =O (oxygen); *n* is either zero or 1; *m* is a number from 0 through 6, said word aryl meaning phenyl or naphthyl.

4,072,677
PENICILLIN SYNTHESIS

Sidney Edward Callander, Worthing, England, assignor to Beecham Group Limited, United Kingdom

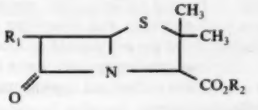
Filed Nov. 30, 1976, Ser. No. 746,137

Claims priority, application United Kingdom, Dec. 13, 1975, 51136/75

Int. Cl.[2] **C07D** *499/68, 499/70*

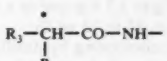
U.S. Cl. 260—239.1 **10 Claims**

1. A process for the preparation of a compound of formula (I):

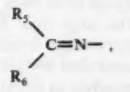


(I)

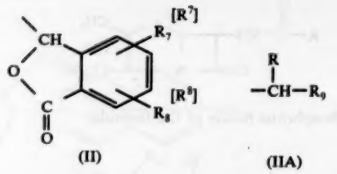
wherein R_1 is a group



or



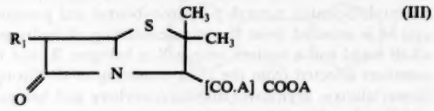
wherein R_3 is phenyl, p-hydroxyphenyl, cyclohexadienyl, or 2-or 3-thienyl, R_4 is an amino or *conventional penicillin* protected amino group, R_5 and R_6 are both methyl or, together with the carbon atom to which they are joined, represent a cycloheptyl ring; and R_2 is a group of formula (II) or (IIA):



(II) (IIA)

wherein R_7 and R_8 are the same or different and are hydrogen, methyl or methoxy, R_9 is acetoxy, pivaloyloxy or ethoxycarbonyloxy, and R is hydrogen or methyl;

which process comprises reacting an aqueous solution of a compound of formula (III):



(III)

wherein R_1 has the above meaning and A is a salt-forming ion, with a solution in a water-immiscible organic solvent of a compound R_2OH or a reactive esterifying derivative thereof, in the presence of a phase transfer catalyst which is a compound which increases the solubility of the salt form of the parent penicillin in the water-immiscible solvent.

4,072,678

PROCESS FOR PRODUCING CAPROLACTAM

Fusao Oyama; Sadatomi Murao, and Shizuo Okada, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed June 21, 1976, Ser. No. 698,122

Claims priority, application Japan, June 24, 1975, 50-79198

Int. Cl.[2] C07D *201/04*

U.S. Cl. 260—239.3 A **9 Claims**

1. A process for producing caprolactam by effecting Beckmann rearrangement of cyclohexanone oxime with a concentrated sulfuric acid or fuming sulfuric acid, neutralizing the rearranged mixture with ammonia and separating ammonium sulfate and caprolactam from the neutralized product, wherein the improvement comprises treating process waste waters after separation of said ammonium sulfate and caprolactam in accordance with the following steps:

(1) first concentrating by distillation at a temperature in the range from 80° to 130° C under a pressure in the range from 400 mm Hg to 2.7 Kg/cm^2 to a water concentration in the range from 85 to 75 wt.%;

(2) then further concentrating by distillation of the concentrate at a temperature in the range from 40° to 80° C under a pressure in the range from 50 to 400 mm Hg to a water concentration in the range from 70 to 15 wt.%;

(3) extracting the caprolactam from the thus obtained concentrate at a pH controlled to a pH between 2.5 and 6 with an aromatic hydrocarbon as an extraction solvent thereby to recover the caprolactam;

(4) conducting oxidative combustion of the extraction residue at a temperature in the range from 800° to 1300° C; and,

(5) converting the thus formed sulfur dioxide to sulfuric acid.

4,072,679

1,4- AND 4,10-DIHYDRO-4-OXO-PYRIMIDO (1,2-a)-BENZIMIDAZOLE-3-CARBOXYLIC ACIDS, ESTERS AND AMIDES

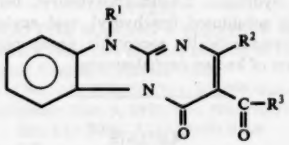
Theodor Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed June 15, 1976, Ser. No. 696,329

Int. Cl.[2] C07D *487/04*; A61K *31/53*

U.S. Cl. 260—256.4 F **18 Claims**

1. A compound of the formula



wherein

R^1 is hydrogen, lower alkyl, phenyl-lower alkyl or lower alkyl

R^2 is hydrogen or lower alkyl;

R^3 is hydroxy, lower alkoxy or

R^4 and R^5 each is lower alkyl;

R^6 and R^7 each is hydrogen, lower alkyl, phenyl, substituted phenyl wherein the phenyl substituent is halo, lower alkyl or lower alkoxy or phenyllower alkyl; and physiologically acceptable salts thereof.

4,072,680

DERIVATIVES OF PYRAZOLO[1,5-a]PYRIDO[3,2-e]PYRIMIDINE

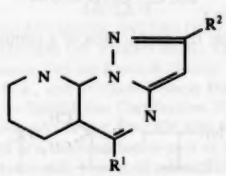
Theodor Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Apr. 28, 1977, Ser. No. 791,814

Int. Cl.[2] C07D *471/14*; A61K *31/415*

U.S. Cl. 260—256.4 F **16 Claims**

1. A compound of the formula



wherein R^1 is lower alkoxy, lower alkylthio, amino, lower alkylamino or di(lower alkyl)amino;

R^2 is hydrogen or lower alkyl.

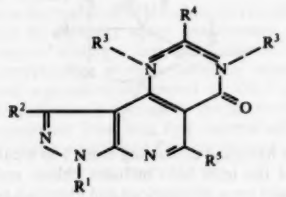
4,072,681

3,7-DIHYDRO- AND 1,7-DIHYDRO-4H-PYRAZOLO[4',3':5,6]PYRIDO[4,3-d]PYRIMIDIN-4-ONES

Theodor Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 2, 1977, Ser. No. 773,562
Int. Cl.[2] A61K *31/415;* C07D *471/14*
U.S. Cl. 260—256.4 F 19 Claims

1. A compound of the formula



wherein

R^1 is hydrogen, lower alkyl or phenyl;

R^2, R^4 and R^5 each is hydrogen or lower alkyl; and

R^3 is hydrogen, lower alkyl, phenyl, substituted phenyl wherein the phenyl substituent is one or two halo, lower alkyl or lower alkoxy groups, phenyl-lower alkyl or di(-lower alkyl)amino-lower alkyl.

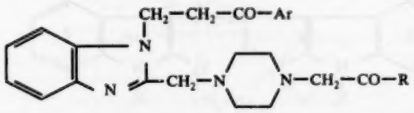
4,072,682

NEW 1-(2'-AROYL ETH-1' YL) 2-(4''-ACETAMIDO PIPERAZINE-1'' YL METHYL) BENZIMIDAZOLES, THEIR THERAPEUTICAL APPLICATIONS AND METHOD FOR THEIR PREPARATION

Claude P. Fauran; Michel J. Turin, both of Paris; Thierry F. Imbert, La Celle Saint-Cloud; Guy M. Raynaud, and Nicole A. M. Dorme, both of Paris, all of France, assignors to Delalande S.A., Courbevoie, France

Filed Dec. 22, 1975, Ser. No. 643,490
Claims priority, application France, Jan. 10, 1975, 75 00724
Int. Cl.[2] C07D *241/04*
U.S. Cl. 260—268 BC 4 Claims

1. A compound having the formula



wherein Ar is α-furyl, α-thienyl, phenyl or phenyl substituted by one substituent selected from the group consisting of methoxy, alkyl having one to 4 carbon atoms, nitro and chloro, and

R is $—NH_2$, $—NHR^1$ wherein R^1 is alkyl having one to four carbon atoms or cycloalkyl having 5 or 6 carbon atoms, or $—NR_1R_2$ wherein R_1 and R_2 are alkyls having one to 4 carbon atoms or $—NR_1R_2$ is piperidino, pyrrolidino or hexamethyleneimino, and the pharmaceutically acceptable acid addition salts thereof.

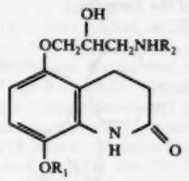
4,072,683

3,4-DIHYDROCARBOSTYRIL DERIVATIVES

Kazuyuki Nakagawa, Tokushima; Minoru Uchida, Komatsushima, and Hiroaki Oka, Tokushima, all of Japan, assignors to Otsuka Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Nov. 10, 1975, Ser. No. 630,631
Claims priority, application Japan, Nov. 8, 1974, 49-129386; Nov. 8, 1974, 49-129387
Int. Cl.[2] C07D *215/22, 215/26;* A61K *31/47*
U.S. Cl. 260—288 R 8 Claims

1. A compound of the formula,



wherein R_1 is hydrogen, C_1–C_4 alkyl, benzyl or phenethyl and R_2 is C_1–C_4 alkyl or a pharmaceutically acceptable acid addition salt thereof.

4,072,684

MANUFACTURE OF PYRIDINE AND METHYLPYRIDINES

John Irvine Darragh, Runcorn, England, assignor to Imperial Chemical Industries Limited, Great Britain

Filed Jan. 17, 1977, Ser. No. 760,143
Claims priority, application United Kingdom, Feb. 2, 1976, 3998/76
Int. Cl.[2] C07D *213/06*
U.S. Cl. 260—290 P 7 Claims

1. A process for the manufacture of pyridine which comprises the vapour-phase reaction, in the presence of a catalyst comprising alumina-silica and at a temperature in the range from 300° C to 500° C, of 1,3-butadiene and methylamine in the presence of a gaseous diluent wherein there is employed at least 0.5 mole of methylamine per mole of butadiene.

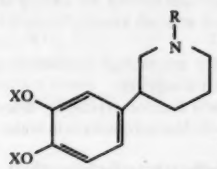
4,072,685

3-(3',4'-DISUBSTITUTED) PHENYL PIPERIDINES

Lucien Nédélec, Le Raincy; Jacques Guillaume, Aulnay-sous-Bois, and Claude Dumont, Nogent-sur-Marne, all of France, assignors to Roussel Uclaf, Paris, France

Filed May 13, 1976, Ser. No. 686,090
Claims priority, application France, May 16, 1975, 75 15382
The portion of the term of this patent subsequent to Sept. 6, 1994, has been disclaimed.
Int. Cl.[2] C07D *211/22*
U.S. Cl. 260—293.81 18 Claims

1. A compound selected from the group consisting of a compound of the formula



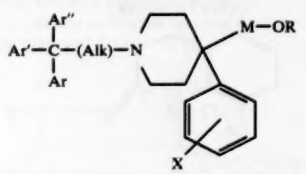
wherein X is selected from the group consisting of hydrogen and acyl of an alkanoic acid of 2 to 6 carbon atoms and R is selected from the group consisting of alkyl of 1 to 5 carbon atoms, alkenyl of 2 to 5 carbon atoms and phenylalkyl of 1 to 3 alkyl carbon atoms and their non-toxic, pharmaceutically acceptable acid addition salts.

4,072,686
1-(3,3,3-TRIARYLALKYL)-4-PHENYL-PIPERIDINEALKANOLS

Gilbert W. Adelstein, Evanston; Esam Z. Dajani, Buffalo Grove, and Chung Hwai Yen, Skokie, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 568,439, April 16, 1975, Pat. No. 3,998,832. This application Oct. 18, 1976, Ser. No. 733,502
Claims priority, application South Africa, Mar. 18, 1976, 76/1681
Int. Cl.[2] C07D *401/06, 211/22*
U.S. Cl. 260—293.69 28 Claims

1. A compound of the formula



(I)

and pharmaceutically acceptable acid addition salts thereof wherein the Alk is straight or branched chain alkylene containing 2–4 carbon atoms; M is alkylene having 1–4 carbon atoms; Ar and Ar' are phenyl, alkyl substituted phenyl wherein the alkyl contains from 1–4 carbon atoms or halo substituted phenyl; Ar'' is phenyl, alkyl substituted phenyl wherein the alkyl contains 1–4 carbon atoms, halo substituted phenyl or pyridyl; X is hydrogen, halogen, trifluoromethyl or alkyl having from 1–4 carbon atoms; R is hydrogen, alkyl having from 1–7 carbon atoms or alkanoyl having from 2–5 carbon atoms.

12. A compound according to claim 1 which is 1-[3,3-diphenyl-3-(2-pyridyl)propyl]-4-phenyl-4-piperidinemethanol.

4,072,687
PROCESS FOR PRODUCING 2-AMINO-(2)-THIAZOLINE-4-CARBOXYLIC ACID

Kazushi Togo, Yokohama; Fumihide Tamura, Kawasaki; Naohiko Yasuda, Yokosuka; Takehiko Ichikawa, Fujisawa; Konosuke Sano, Machida; Keizo Matsuda, Kawasaki, and Koji Mitsugi, Yokohama, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Nov. 1, 1976, Ser. No. 737,781
Claims priority, application Japan, Nov. 6, 1975, 50-133372; Dec. 16, 1975, 50-149998; Mar. 19, 1976, 51-30537
Int. Cl.[2] C07D *277/18*
U.S. Cl. 260—306.7 T 7 Claims

1. A process for producing 2-amino-(2)-thiazoline-4-carboxylic acid which comprises dehydrochlorinating S-(β-carboxy-β-chloroethyl) isothiourea by adding it to an aqueous medium maintained at a pH ranging from 5.5 to 7.5 with an alkali.

3. A process for producing 2-amino-(2)-thiazoline-4-carboxylic acid, which comprises:

preparing an alkyl α-chloracrylate by dehydrochlorinating an alkyl α, β-dichloropropionate in water in the presence of an alkali;

preparing a S-(β-carboxy-β-chloroethyl) isothiourea by reacting said alkyl α-chloroacrylate with thiourea in water in the presence of a mineral acid; and

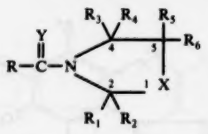
dehydrochlorinating said S-(β-carboxy-β-chloroethyl) isothiourea by adding said S-(β-carboxy-β-chloroethyl) isothiourea to an aqueous medium maintained at a pH ranging from 5.5 to 7.5 with an alkali.

4,072,688
HALOACYL AND THIOHALOACYL ARYL-SUBSTITUTED OXAZOLIDINES AND THIAZOLIDINES-HERBICIDAL ANTIDOTES

Eugene G. Teach, El Cerrito, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 550,069, Feb. 14, 1975, abandoned. This application Nov. 3, 1975, Ser. No. 627,986
Int. Cl.[2] C07D *277/04, 277/06, 263/04*
U.S. Cl. 260—306.7 R 32 Claims

1. A compound according to the formula



in which R is haloalkyl containing from 1 to 6 carbon atoms, inclusive, and the term halo includes chloro and bromo as mono, di, tri and tetra substitutions and chloroalkenyl containing 2 to 4 carbon atoms and the chloro substituents are present as mono, di, tri or tetra substitutions; in which X and Y are independently oxygen or sulfur; R_1 is hydrogen, lower alkyl or phenyl; R_2 is hydrogen or lower alkyl; R_3 is hydrogen or lower alkyl; R_4 is hydrogen or lower alkyl; R_5 is phenyl and R_6 is hydrogen.

4,072,689
MONOAMINO 2,4,5-TRISUBSTITUTED OXAZOLES

Giorgio Tarzia, Rome, Italy, assignor to Gruppo Lepetit S.p.A., Milan, Italy

Continuation of Ser. No. 334,928, Feb. 22, 1973, abandoned. This application Dec. 17, 1975, Ser. No. 641,410
Int. Cl.[2] C07D *263/34*
U.S. Cl. 260—307 R 5 Claims

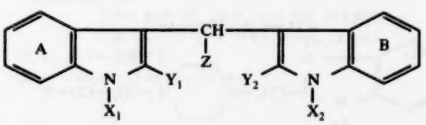
1. 5-Carbamoyl-4-methyl-2-phenyloxazole, 4-carbamoyl-5-methyl-2-phenyloxazole, 4-cyclohexylcarbamoyl-5-methyl-2-(p-tolyl)oxazole or 4-carbamoyl-2-(o-fluorophenyl)-5-methyloxazole.

4,072,690
INDOLYL METHYLENE LEUCO DYESTUFFS

Robert Garner, Bury; John Barry Henshall, Manchester, both of England, and Jean-Claude Petitpierre, Kaiseraugst, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 23, 1975, Ser. No. 543,581
Claims priority, application United Kingdom, Feb. 1, 1974, 4687/74
Int. Cl.[2] C07D *209/20, 403/10, 403/14*
U.S. Cl. 260—326.14 R 8 Claims

1. An indolyl methylene compound of the formula



(I)

wherein X_3 represents alkyl with 2 to 12 carbon atoms or benzyl, Y_3 represents hydrogen, methyl, ethyl or phenyl, Z_1 represents an aralkyl radical selected from benzyl and styryl, an aryl radical selected from phenyl, diphenyl or naphthyl which is unsubstituted or substituted hy halogen, methylenedioxy, nitro, alkyl having 1 to 4 carbon atoms or by alkoxy having 1 to 4 carbon atoms, or indolyl unsubstituted or substituted by halogen, cyano, nitro, alkyl with 1 to 4 carbon atoms, alkoxy with 1 to 4 carbon atoms, alkanoyl with 2 to 4 carbon atoms or phenyl.

4,072,691

PROCESS FOR THE RESOLUTION OF DL-6-CHLOROTRYPTOPHAN

Ichiro Chibata, Suita; Shigeki Yamada, Toyonaka; Masao Yamamoto, Hirakata, and Hisato Sanematsu, Osaka, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Continuation of Ser. No. 538,107, Jan. 2, 1975, abandoned. This application Apr. 29, 1976, Ser. No. 681,426

Claims priority, application Japan, Jan. 12, 1974, 49-6779; July 9, 1974, 49-78881; Aug. 2, 1974, 49-89231

Int. Cl.[2] C07D *209/20*

U.S. Cl. 260—326.14 T 9 Claims

1. A process for resolving DL-6-chlorotryptophan methanesulfonate into its optically active enantiomers, which comprises the steps of adding a first enantiomer to a solution of DL-6-chlorotryptophan methanesulfonate, whereby a first supersaturated solution with respect to DL-6-chlorotryptophan methanesulfonate is formed, to initiate crystallization of said first enantiomer from said first supersaturated solution, and recovering the crystallized first enantiomer.

4,072,692

TRANS-4-(8-HYDROXYOCTYL)-5-OCTYL-1,3-DITHIOLANE-2-THIONE

Sol Jacob Daum, Albany, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed Oct. 15, 1976, Ser. No. 732,651

Int. Cl.[2] C07D *339/06*

U.S. Cl. 260—327 M 1 Claim

1. The trans-isomer of 4-(8-hydroxyoctyl)-5-octyl-1,3-dithiolane-2-thione.

4,072,693

MACROCYCLIC POLYETHERS

David N. Reinhoudt, and Robin Th. Gray, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 5, 1976, Ser. No. 664,331

Claims priority, application United Kingdom, Mar. 14, 1975, 10744/75

Int. Cl.[2] C07D *317/00;* A61L *13/00*

U.S. Cl. 260—338 1 Claim

1. The macrocyclic polyether 3,4-benzo-1,6,9,12-tetraoxycyclotetradec-3-ene.

4,072,694

DIOXOLANE DERIVATIVES AND USE AS PHOTOINITIATORS

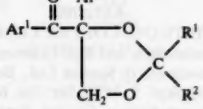
Alan Joseph Brattesani, Los Angeles, Calif., assignor to Lee Pharmaceuticals, South El Monte, Calif.

Filed Sept. 15, 1975, Ser. No. 613,286

Int. Cl.[2] C07D *317/10*

U.S. Cl. 260—340.9 R 11 Claims

1. Compounds having the general formula:



wherein R^1 and R^2 are each organic radicals selected from the group consisting of vinyl, hydroperoxy, alkyl or alkenyl groups of up to about 16 carbon atom length, cycloaliphatic groups of lower than 210 molecular weight, phenyl, naphthyl, phenoxy, benzoyl, naphthoxyl, phenylcarboxy, and substituted aliphatic groups of up to 200 molecular weight, and Ar^1 and Ar^2 are each selected from the group consisting of phenyl, naphthyl, non-sterically hindered substituted phenyl, and non-sterically hindered substituted naphthyl in which each substituent is a radical selected from the group consisting of amino, nitro, chloro-, bromo-, iodo-, fluoro-, lower alkylamino-, anilino-, di- lower alkylamino-, diphenylamino, lower alkoxy, carboxy, hydroxy, sulfonyl, acetyl, propionyl, aldehydo, acetoxy, propionoxy, amido, lower alkylamido, vinyl, lower alkenyl, lower alkynyl, lower alkyl, phenyl, benzyl, naphythyl, cyclohexyl, cyclopentyl, lower alkyl amido, di- lower alkyl amido, phenyl amido, and diphenyl amido with the proviso that when Ar^1 and Ar^2 are phenyl or lower alkyl-substituted phenyl and one of R^1 and R^2 is lower alkyl, the other may not be lower alkyl, cycloalkyl or phenyl.

4,072,695

3α,7α-DIHYDROXY-CHOLANIC ACID DERIVATIVES

William H. Saltzman, New Rochelle, N.Y., assignor to Intellectual Property Development Corporation, New Rochelle, N.Y.

Continuation of Ser. No. 660,037, Feb. 2, 1976, Pat. No. 4,014,908, which is a continuation-in-part of Ser. No. 474,735, May 30, 1974, abandoned, which is a continuation of Ser. No. 467,710, May 7, 1974, abandoned, and a continuation-in-part of Ser. No. 417,170, Nov. 19, 1973, Pat. No. 3,916,266, said Ser. No. 467,710, and Ser. No. 417,170, each is a continuation-in-part of Ser. No. 290,910, Sept. 21, 1972, abandoned. This application Sept. 17, 1976, Ser. No. 725,086

Int. Cl.[2] C07J *5/00*

U.S. Cl. 260—397.1 4 Claims

1. A clathrate consisting of a needle-like crystalline inclusion complex of 3α, 7α-dihydroxy-5β-cholanic acid and as an included compound, an organic solvent selected from the group consisting of, cyclopentane, cyclohexane and cycloheptane.

4,072,696

5(6)-BENZENE RING SUBSTITUTED BENZIMIDAZOLE-2-CARBAMATE DERIVATIVES HAVING ANTHELMINTIC ACTIVITY

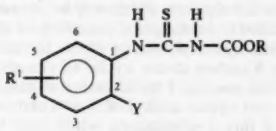
Colin C. Beard, Palo Alto; John A. Edwards, Los Altos, and John H. Fried, Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 331,852, Feb. 12, 1973, abandoned. This application Jan. 18, 1974, Ser. No. 434,656

Int. Cl.[2] C07C *147/00, 147/06, 149/40*

U.S. Cl. 260—397.6 51 Claims

1. A compound selected from the group of compounds represented by the formula:



where R is a lower alkyl group having 1 to 4 carbon atoms; R^1 is $—SR^2$, $—SOR^2$, $—OR^2$, —SCN, or $—M'(CH_2)_nMR^7$ where n is 1–4; R^2 is lower alkyl having 1 to 6 carbon atoms, cycloalkyl having 3 to 7 carbon atoms, lower alkenyl or lower alkynyl having 3 to 6 carbon atoms, benzyl or phenyl, provided that when R^1 is $—SO_2R^2$, R^2 is not benzyl or phenyl, provided further that when R^1 is either $—SR^2$ or $—OR^2$, R^2 can not be either alkyl or cycloalkyl; Y is amino, nitro, alkanoylamino having 1 to 6 carbon atoms, $—NHC(O)(CH_2)_mCOOH$ where *m* is 1–6, or —NHC(S)NHCOOR; M and M′ are independently O, S or

and R^7 is lower alkyl having 1 to 4 carbon atoms or phenyl; the R^1-substitution being at the 4- or 5-position; and the pharmaceutically acceptable salts thereof.

4,072,697
METHOD FOR DEODORIZING LIQUID LANOLIN

Hisashi Sekine, Mitsukaido; Akira Yamamoto, Funabashi, and Shizuo Hayashi, Saitama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Apr. 14, 1976, Ser. No. 676,738
Claims priority, application Japan, June 16, 1975, 50-72935
Int. Cl.[2] C07J 9/00
U.S. Cl. 260—397.25 6 Claims

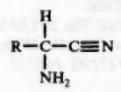
1. A method for deodorizing liquid lanolin having a cloud point of about 17°–18° C and a solidifying point of about 3°–4° C, which consists essentially of the steps of adding to liquid lanolin containing odor-causing substances and mixing uniformly therein a solvent for said odor-causing substances selected from the group consisting of methanol, ethanol, mixtures of methanol and ethanol, and aqueous solutions thereof containing up to 50% by weight of water, the weight ratio of said solvent to said liquid lanolin being in the range of from 0.5/1.0 to 4.0/1.0, the mixing being carried out at a temperature of from 40° to 80° C and for a period of time effective to dissolve in said solvent the odor-causing substances initially present in the liquid lanolin, then while maintaining the mixture at 40° to 80° C separating and removing the solvent phase containing the odor-causing substances dissolved therein from the liquid lanolin and thereby recovering deodorized liquid lanolin.

4,072,698
RESOLUTION OF AMINONITRILES

Thomas A. Hylton, Kalamazoo, and Francis L. Shenton, Portage, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Dec. 2, 1976, Ser. No. 746,932
Int. Cl.[2] C07C 121/78, 121/80
U.S. Cl. 260—465 E 37 Claims

1. A process for producing an optically pure 2-aminonitrile enantiomer of the formula:



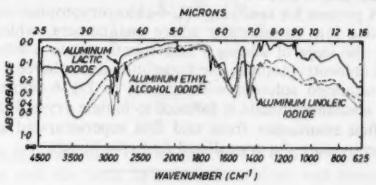
III

where R is alkyl of 1 thru 6 carbon atoms; cycloalkyl of 3 thru 6 carbon atoms; aromatic of 6 thru 10 carbon atoms, substituted with 0 thru 3 substituents, which may be the same or different and are selected from the group consisting of alkyl of 1 thru 6 carbon atoms, hydroxyl, alkoxy where the alkyl group contains 1 thru 6 carbon atoms, cyclic alkylenedioxy where the alkylene group contains 1 thru 3 carbon atoms, halogen, trifluoromethyl, and cyano; aralkyl of 7 or 8 carbon atoms substituted with 0 thru 3 substituents, which may be the same or different and are selected from the group consisting of alkyl of 1 thru 6 carbon atoms, hydroxyl, alkoxy where the alkyl group contains 1 thru 6 carbon atoms, or cyclic alkylenedioxy where the alkylene group contains 1 thru 3 carbon atoms; 2- or 3-furyl, 2- or 3-thienyl and 2- or 3-indolylmethyl in acid salt form in an amount greater than present in an optically impure 2-aminonitrile (III) mixture which comprises contacting the optically impure 2-aminonitrile (III) mixture with an optically active acid in the presence of a compound of the formula R_1COR_2 (IV), the methyl or ethyl actal, ketal, hemiacetal, or hemi-ketal thereof, where R_1 and R_2 may be the same or different with the proviso that both R_1 and R_2 cannot both be aromatic and where R_1 is alkyl of 1 thru 6 carbon atoms; cycloalkyl of 4 thru 6 carbon atoms; aromatic of 6 thru 10 carbon atoms, substituted with 0 thru 3 substituents selected from the group consisting of alkyl of 1 thru 6 carbon atoms, halogen, alkoxy where the alkyl group contains 1 thru 6 carbon atoms; or aralkyl of 7 or 8 carbon atoms; R_2 is hydrogen or R_1; and when R_2 is not hydrogen, R_1 and R_2 taken together with the attached carbon atom may form a cyclic ketone selected from the group consisting of cyclobutanone, cyclopentanone, cyclohexanone and cycloheptanone, and separating the diastereomeric acid salt of the optically pure 2-aminonitrile (III) enantiomer.

4,072,699
ALUMINUM ORGANOIODIDES

George G. Merkl, 46 Sunset Court, Haworth, N.J. 07641

Division of Ser. No. 345,659, March 28, 1973, Pat. No. 3,856,841. This application Oct. 21, 1974, Ser. No. 516,667
Int. Cl.[2] C11C 1/00; C07F 5/06
U.S. Cl. 260—408 10 Claims



1. An aluminum alcohol iodide prepared by contacting and reacting:
   a. iodine;
   b. an alcohol selected from ethyl alcohol, ethenol, ethanolamine, benzyl alcohol, cyclohexanol, furfuryl alcohol, ethylene glycol, sorbitol, phenol, and glycerol; and
   c. a reactive aluminum comprising high purity aluminum metal permeated with from 0.1 to 5.0% by weight of a liquid metal selected from mercury, gallium and indium/-gallium alloys.

3. An aluminum carboxylic iodide prepared by contacting and reacting:
   a. iodine;
   b. a liquid carboxylic acid selected from myristic acid, linoleic acid, lauric acid, formic acid, lactic acid and acrylic acid; and
   c. a reactive aluminum comprising high purity aluminum metal permeated with from 0.1 to 5.0% by weight of a liquid metal selected from mercury, gallium and ind;ium/-gallium alloys.

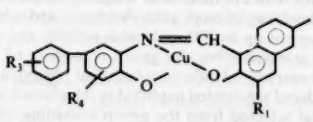
6. An aluminum alcohol-carboxylic acid iodide complex prepared by contacting and reacting:
   a. iodine;
   b. an alcohol selected from ethyl alcohol, ethenol, ethanolamine, benzyl alcohol, cyclohexanol, furfuryl alcohol, ethylene glycol, sorbitol, phenol, and glycerol and a liquid carboxylic acid selected from myristic acid, linoleic acid, lauric acid, formic acid, lactic acid and acrylic acid; and
   c. a reactive aluminum comprising high purity aluminum metal permeated with from 0.1 to 5.0% by weight of a liquid metal selected from mercury, gallium and indium/-gallium alloys.

4,072,700
AZOMETHINE COPPER COMPLEXES

Hans Bohler, Rheinfelden, and Rolf Griesser, Binningen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed Sept. 9, 1975, Ser. No. 611,615
Claims priority, application Sweden, Sept. 16, 1974, 7412571
Int. Cl.[2] C07F 1/08
U.S. Cl. 260—438.1 7 Claims

1. A compound of formula I,



I

wherein

R_1 is hydrogen, carboxy, or phenylaminocarbonyl, the phenyl radical of which is unsubstituted or substituted by up to 2 substituents selected from chlorine, bromine, methyl, cyano, nitro, methoxy and ethoxy,

R_2 is hydrogen, chlorine, bromine, methoxy, ethoxy or nitro, and

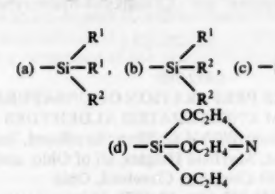
R_3 and R_4 are, independently, hydrogen, chlorine, bromine, methoxy or ethoxy.

4,072,701
PROCESS FOR THE PRODUCTION OF SULFUR CONTAINING ORGANOSILICON COMPOUNDS

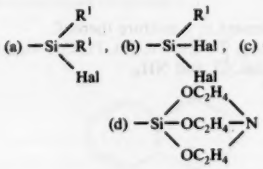
Hans-Dieter Pletka, Hanau, and Rudolf Michel, Freigericht, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Sept. 24, 1976, Ser. No. 730,726
Claims priority, application Germany, Sept. 24, 1975, 2542534
Int. Cl.[2] C07F 7/18
U.S. Cl. 260—448.8 R **18 Claims**

1. A process for the production of a sulfur containing organosilicon compound of the formula (I) Z-Alk-Sx-Alk-Z, where Z is the grouping:



in which R^1 is an alkyl group having 1 to 8 carbon atoms, a cycloalkyl group having 5 to 8 carbon atoms, benzyl, phenyl or phenyl substituted with at least one methyl, ethyl or chloro group and R^2 is alkoxy of 1 to 8 carbon atoms, methoxyethoxy, cycloalkoxy having 5 to 8 carbon atoms, benzyloxy, phenoxy or phenoxy substituted with at least one methyl, ethyl or chloro group, Alk is a divalent hydrocarbon group having 1 to 10 carbon atoms or such a group interrupted once or twice by —O—, —S— or —NH— and x is a number from 2 to 6 comprising reacting a compound of the formula (II) Y-Alk-Hal, where Y is:



where Hal is fluorine, chlorine, bromine or iodine with, when II is (a), (b) or (c), a compound of the formula R^3OH in which R^3 is alkyl of 1 to 8 carbon atoms, methoxyethyl, cycloalkyl having 5 to 8 carbon atoms, benzyl, phenyl or phenyl substituted with at least one methyl, ethyl or chloro group and reacting the resulting product or, when II is (d) reacting II, with a hydrosulfide of the formula III MeSH in which Me is ammonium, an alkali metal atom, an equivalent of an alkaline earth metal or zinc and with sulfur, the amount of sulfur together with the sulfur in MeSH being sufficient to satisfy x in formula I, and removing the ammonium or metal halide.

4,072,702
TRI-FUNCTIONAL ISOCYANATE CROSSLINKING AGENTS FOR HYDROXY-TERMINATED POLYBUTADIENE BINDERS

Chester W. Huskins, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 6, 1976, Ser. No. 752,636
Int. Cl.[2] C07C 119/042, 119/045, 119/048
U.S. Cl. 260—453 AB **3 Claims**

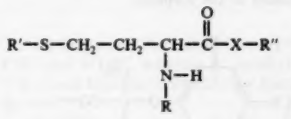
1. A tri-functional isocyanate prepared by the method comprising reacting together in a reflux vessel containing an excess amount of the reacting solvent p-dioxane, three moles of a diisocyanate, and one mole of water selected from distilled water and deionized water, said diisocyanate selected from the group of diisocyanates consisting of isophorone diisocyanate, trimethyl-hexamethylene diisocyanate, and dimeryl diisocyanate, said reacting being carried out under a blanket of dry nitrogen and at reflux conditions for a period of time from about one to about two hours to complete said reacting to form said tri-functional isocyanate in said reacting solvent that is stripped from the reflux vessel to yield said tri-functional isocyanate which is ready for immediate use as a crosslinking agent in a hydroxy-terminated polybutadiene binder system.

4,072,703
THIOL ESTERS OF HOMOCYSTEINE

Jean Blum, Courbevoie, France, assignor to Chimie & Biologie, France

Filed Apr. 14, 1975, Ser. No. 567,752
Claims priority, application France, Mar. 28, 1974, 74 10913
Int. Cl.[2] C07C 153/07, 153/09, 153/11
U.S. Cl. 260—455 R **5 Claims**

1. A compound having the formula:



wherein

X is oxygen;

R and R′ are each selected from the group consisting of p-chlorophenoxy-2-isobutyryl, pivaloyl, m-fluorobenzoyl, trimethoxy-3,4,5 benzoyl, succinoyl, p-chlorophenoxy acetyl, salicyloyl, acetyl-salicyloyl, acetyl, benzoyl, propionyl; and,

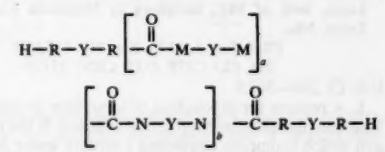
R″ is hydrogen or C_1 to C_4 alkyl.

4,072,704
MULTI-BLOCK COUPLED POLYOXYALKYLENE COPOLYMER SURFACTANTS

William K. Langdon, Grosse Ile, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Continuation-in-part of Ser. No. 498,670, Aug. 19, 1974, abandoned. This application Feb. 2, 1976, Ser. No. 654,268
Int. Cl.[2] C07C 69/96; C08G 63/62
U.S. Cl. 260—463 **2 Claims**

1. A polycarbonate compound having the formula

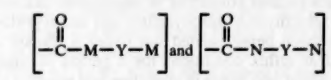


wherein

Y is the residue of an alkylene glycol containing therein two

terminal hydroxyl groups minus the terminal hydrogen atoms, M is a hydrophilic chain of units selected from the group consisting of oxyethylene and oxyethylene-oxypropylene units wherein the oxyethylene content of said hydrophilic chain is from about 75 to 100 weight percent and the oxypropylene content is from 0 to about 25 weight percent, the number of oxyethylene and oxypropylene groups in M being from about 2 to about 15,

N is a hydrophobic chain of units selected from the group consisting of oxypropylene units and oxyethylene-oxypropylene units wherein the oxypropylene content is from about 75 to 100 weight percent and the oxyethylene content is from 0 to about 25 weight percent, the number of oxyethylene and oxypropylene groups in N being from about 2 to about 10, wherein



are linked together either in a random or an ordered manner, R is M or N, and *a* and *b* are integers from 2 to 20 in a ratio between 1:9 to 9:1.

4,072,705

PHENYLMETHYLPHENOXY PROPIONIC ACID ESTERS

André Mieville, Lausanne, Switzerland, assignor to Orchimed S.A., Fribourg, Switzerland

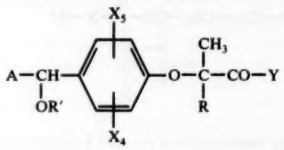
Filed Feb. 9, 1976, Ser. No. 656,711

Claims priority, application United Kingdom, Feb. 12, 1975, 5979/75; Dec. 10, 1975, 50630/75

Int. Cl.² C07C *69/76*

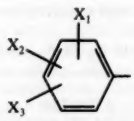
U.S. Cl. 424—308 **8 Claims**

1. A compound of the formula:



(II)

wherein A is



and X_1, X_2 and X_3 are the same or different and are H, Cl, Br, F; Y is OH or alkoxy; each of R, X_4 and X_5 is hydrogen or C_{1-4} alkyl; R′ is H, C_{1-4} alkyl or acetyl; or an acid addition salt thereof.

4,072,706

OXIDATION OF PHOSPHONOMETHYLAMINES

Arnold Hershman, Creve Coeur, and James W. Gambell, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Jan. 2, 1976, Ser. No. 645,988

Int. Cl.² C07F *9/38*; C07C *85/20*

U.S. Cl. 260—502.5 **15 Claims**

1. A process for production of secondary amines having at least one phosphonomethyl group attached to the amine nitrogen which comprises contacting a tertiary amine having more than one phosphonomethyl group attached to the amine nitrogen and in which other substituents on the nitrogen atom are not more readily removable by oxidation than the phosphonomethyl group, with oxygen at a temperature from ambient to about 250° C and sufficient to oxidize chemically the amine and effect removal of a phosphonomethyl group, and recovering the resulting secondary amine in substantial yield.

4,072,707

PREPARATION OF 3,5-DIALKYL-4-HYDROXYBENZOIC ACID

Vincent Gerard Grosso, Piscataway, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Nov. 3, 1976, Ser. No. 738,215

Int. Cl.² C07C *65/02*

U.S. Cl. 260—521 C **6 Claims**

1. A process for the preparation of sterically hindered 3,5-dialkyl-4-hydroxybenzoic acid wherein at least one of the alkyl groups therein is branched on the alpha carbon atom which comprises reacting a solution in a dry dipolar aprotic solvent of a sterically hindered 2,6-dialkylphenol wherein at least one of the alkyl groups is branched on the alpha carbon with sodium hydride or lithium hydride, the mole ratio of said hydride to said phenol being between about 1.0 and 5; reacting the thus formed phenolate in solution in said dry dipolar aprotic solvent with an excess of carbon dioxide at a temperature of about 70°–80° C.; adding to the resulting reaction mixture sufficient of a lower alcohol to destroy any excess sodium hydride or lithium hydride present therein; forming a two-phase system by adding to the resulting reaction mixture water and a water-immiscible organic solvent; separating the aqueous phase and acidifying to precipitate the 3,5-dialkyl-4-hydroxybenzoic acid.

4,072,708

PROCESS FOR THE PREPARATION OF UNSATURATED ACIDS FROM UNSATURATED ALDEHYDES

James F. White, Akron; Wilfrid G. Shaw, Lyndhurst, and Michael D. Applequist, Mayfield Heights, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Division of Ser. No. 733,737, Oct. 19, 1976. This application Jan. 31, 1977, Ser. No. 764,127

Int. Cl.² C07C *51/32*

U.S. Cl. 260—530 N **18 Claims**

1. In the process for the production of acrylic acid and methacrylic acid by the oxidation of acrolein and methacrolein respectively, with molecular oxygen in the vapor phase at a reaction temperature of about 200° C to about 500° C. in the presence of a catalyst, and optionally in the presence of steam, the improvement comprising using as a catalyst a catalyst of the formula

$$X_aY_bMo_{12}P_cAs_dO_x$$

wherein

X is a rare earth element or a mixture thereof;

Y is at least one of Ag, Tl, Rh, Pd, Ru, Pt, Cd, Al, Au, Cu, alkaline earth metal, Cl, and NH_4;

wherein

a is 0.001 to 10;

b is 0 to 10;

c is 0.01 to 5;

d is 0.01 to 5;

x is the number of oxygens required to satisfy the valence states of the other elements present.

4,072,709

PRODUCTION OF LACTIC ACID

Harold Burnham Tinker, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed May 27, 1975, Ser. No. 581,245

Int. Cl.² C07C *59/08*

U.S. Cl. 260—535 R **24 Claims**

1. The process of preparing lactic acid which comprises

hydroformylating a vinyl carboxylate with carbon monoxide and hydrogen in contact with a hydroformylation catalyst to prepare an alpha-acyloxypropionaldehyde, and oxidizing and hydrolyzing the intermediate to obtain lactic acid.

4,072,710
PROCESS FOR PREPARING ACID CHLORIDES

Antonio Luis Palomo Coll, Maestro Perez Cabrero 7, Barcelona, Spain

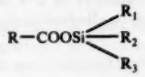
Filed Nov. 7, 1975, Ser. No. 629,786

Claims priority, application Spain, Nov. 9, 1974, 431806; Oct. 8, 1975, 441581

Int. Cl.[2] C07C *51/58*

U.S. Cl. 260—544 D **6 Claims**

1. A process for the preparation of acid chlorides, wherein there is used a silyl ester of the following general formula:



where R is a substituted or unsubstituted aralkyl, aliphatic, aromatic, or heterocyclic group provided that the substituent is not an amino group, and R_1, R_2 and R_3 are alkyl of 1–3 carbon atoms or phenyl, which is reacted with thionyl chloride in an inert solvent at a temperature of from −15° to 50° C to obtain a compound of the general formula:

where R has the same meaning as given above.

4,072,711
TETRAHYDRO-4-SEMICARBAZONO-1-NAPHTHYLUREAS

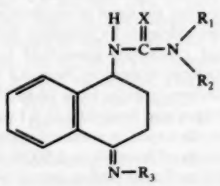
Goro Asato, Titusville, and Terence James Bentley, South Cranbury, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 705,313, July 14, 1976, Pat. No. 4,041,070. This application Mar. 25, 1977, Ser. No. 781,232

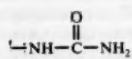
Int. Cl.[2] C07C *133/08, 157/09;* A61K *31/175*

U.S. Cl. 260—554 **4 Claims**

1. A compound of formula:



wherein X is oxygen or sulfur; R_1 is hydrogen or alkyl C_1–C_4; R_2 is hydrogen, alkyl C_1–C_4, 2-propynyl, alkoxy C_1–C_4 or benzyloxy; R_3 is the moiety



the racemic mixtures and the optical isomers thereof.

4,072,712
PROCESS FOR THE PRODUCTION OF CARBODIIMIDES AND CARBODIIMIDE-ISOCYANATE ADDUCTS

Ernst Meisert, Leverkusen-Schlebusch, and Peter Fischer, Cologne-Flittard, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

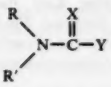
Continuation of Ser. No. 381,102, July 20, 1973, abandoned, which is a continuation of Ser. No. 56,976, July 21, 1970, abandoned, which is a continuation-in-part of Ser. No. 623,818, March 17, 1967, abandoned. This application Dec. 17, 1976, Ser. No. 751,839

Claims priority, application Germany, Mar. 18, 1966, F48694

Int. Cl.[2] C07C *119/055*

U.S. Cl. 260—566 R **8 Claims**

1. A method for preparing carbodiimides which comprises heating an organic isocyanate at a temperature of at least about 150° C. in the presence of a catalytic amount of a catalyst having the formula:



wherein

R and R′ are the same or different and represent hydrogen, alkyl, aryl and when joined together form a heterocyclic ring;

Y is hydrogen, alkyl, chloroalkyl, aryl, alkoxyphosphono and

wherein Q is hydrogen, alkyl, or aryl; Q′ is hydrogen, alkyl, aryl, COR″ and SO_2R'', wherein R″ is alkyl or aryl, and when Y is joined together with R, they form a heterocyclic ring; and

X is oxygen or sulfur.

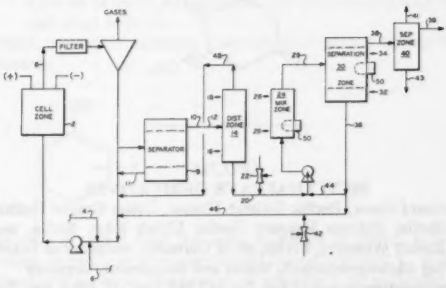
4,072,713
METHOD FOR SEPARATING TETRAALKYLAMMONIUM SALTS

Geir Bjornson, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed July 27, 1972, Ser. No. 275,546

Int. Cl.[2] C07C *87/32*

U.S. Cl. 260—567.6 M **7 Claims**



1. In a process for the production of adiponitrile wherein acrylonitrile, an aqueous electrolyte, and a tetraalkylammonium salt, each of the alkyl radicals of which has 1–20 carbon atoms and the tetraalkylammonium has 11–25 carbon atoms, are subjected to an electrolysis in an electrohydrodim-

erization cell, and wherein the adiponitrile formed is recovered from a first emulsion coming from said cell,

the improvement which comprises

separating said first emulsion to form a first organic and a first aqueous phase,

distilling said first organic phase to remove acrylonitrile therefrom,

mixing the remaining first organic phase with phosphoric acid to form a second emulsion,

separating said second emulsion into a second aqueous and a second organic phase,

and recovering the adiponitrile from the organic phase and the aqueous phase comprising the tetraalkylammonium phosphate salt.

4,072,714
HYDROGENATION OF ACETYLENE ALCOHOLS

Dieter Voges, Mannheim; Karl Baer, Weinheim; Juergen Boudier, Duerkheim; Siegfried Winderl, Heidelberg-Wieblingen, and Herwig Hoffmann, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Division of Ser. No. 706,471, July 19, 1976, Pat. No. 4,048,116. This application Feb. 4, 1977, Ser. No. 765,762

Claims priority, application Germany, July 19, 1976, 2536273

Int. Cl.[2] C07C *89/00, 29/00*

U.S. Cl. 260—584 R **4 Claims**

1. A process for the manufacture of saturated alcohols by hydrogenation of acetylenically unsaturated alcohols, wherein hydrogenation is carried out in the presence of a catalyst which comprises nickel as the main ingredient, from about 30 to 40% by weight of copper, based on nickel, and from about 1 to 10% by weight of a mixture of manganese and molybdenum oxides, based on the total weight of the catalyst.

4,072,715
OPTICALLY ACTIVE CYCLOHEXANE DERIVATIVES

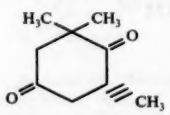
Walter Boguth, Riehen; Hans Georg Wilhelm Leuenberger, Arlesheim; Hans Johann Mayer, Fullinsdorf; Erich Widmer, Munchenstein, and Reinhard Zell, Rodersdorf, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 601,770, Aug. 4, 1975, Pat. No. 3,988,205. This application July 20, 1976, Ser. No. 707,123

Int. Cl.[2] C07C *49/30*

U.S. Cl. 260—586 R **2 Claims**

1. An optically active compound of the formula



4,072,716
BICYCLOALKANE DERIVATIVES

Gerhard Sauer, Berlin; Helmut Hauser, Unna; Gregor Haffer, Berlin; Juergen Ruppert, Berlin; Ulrich Eder, Berlin, and Rudolf Wiechert, Berlin, all of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

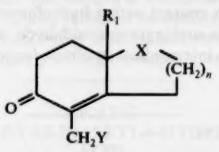
Continuation-in-part of Ser. No. 317,549, Dec. 22, 1972, Pat. No. 4,008,253. This application Dec. 27, 1976, Ser. No. 754,000

Claims priority, application Germany, Dec. 24, 1971, 2165320; Apr. 29, 1972, 2221704; Nov. 2, 1972, 2254175

Int. Cl.[2] C07C *49/54*

U.S. Cl. 260—586 F **14 Claims**

1. A bicycloalkane of the formula



wherein n is 1 or 2, R_1 is alkyl of 1–4 carbon atoms, X is carbonyl, hydroxymethylene or alkoxymethylene of 1–10 carbon atoms in the alkyl group, and Y is —S—R_2, —SO_m—R_2, or

wherein m is 1 or 2, R_2 is alkyl of 1–12 carbon atoms, R_3 is hydrogen or alkyl of 1–4 carbon atoms, R_4 is aliphatic acyl of 2–16 carbon atoms, and Z is nitro, alkanoyl of 2–4 carbon atoms, alkylsulfinyl of 1–4 carbon atoms or alkylsulfonyl of 1–4 carbon atoms.

4,072,717
MANUFACTURE OF FORMALDEHYDE

Guenter Halbritter, Germersheim; Wolfgang Muehlthaler, Hemsbach; Heinrich Sperber, Ludwigshafen; Hans Diem, Ludwigshafen; Christian Dudeck, Ludwigshafen, and Gunter Lehmann, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Aug. 22, 1975, Ser. No. 606,773

Claims priority, application Germany, Sept. 4, 1974, 2442231

Int. Cl.[2] C07C *45/16*

U.S. Cl. 260—603 C **12 Claims**

1. In a process for the manufacture of formaldehyde by oxidative dehydrogenation of methanol in the presence of a silver catalyst, at an elevated temperature, the improvement wherein the reaction is started at a lower throughput and a lower temperature comprising

(a) a gaseous starting mixture consisting of methanol and steam, containing from 0.1 to 0.7 mole of water per mole of methanol, is passed through a catalyst bed of silver particles, heated to from 250 to 450° C, at a throughput of from 0.04 to 1.0 tonne of methanol per square meter of catalyst bed cross-section per hour, thereafter

(b) air corresponding to from 0.3 to 0.6 mole of oxygen per mole of methanol is thereafter added to the starting mixture at the above temperature, and the silver-catalyzed reaction is started,

(c) at a point in time ranging from just after the start of said reaction to 0.5 hour after the start of said reaction, an off-gas taken from the same or another process for manufacture of formaldehyde by oxidative dehydrogenation of methanol and containing from 0.25 to 1.0 percent by volume of carbon monoxide, from 3.5 to 10 percent by volume of carbon dioxide, from 10 to 25 percent by volume of hydrogen and from 0.02 to 0.1 percent by volume of formaldehyde vapor, is admixed with the starting mixture, in amounts of from 90 to 3,500% by weight of off-gas, based on methanol, and is passed therewith through said catalyst bed,

(d) the throughput of gaseous mixture fed to the catalyst, and the reaction temperature, are both increased and finally

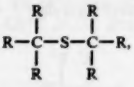
(e) the oxidative dehydrogenation reaction is carried out at from 550° to 800° C, at a throughput of from 1 to 3 tonnes of methanol per square meter of catalyst bed cross-section per hour, using from 0.2 to 0.7 mole of steam and from 0.3 to 0.8 mole of oxygen per mole of methanol, and from 90 to 180% by weight of off-gas, based on methanol.

4,072,718
METHODS OF CONVERTING DITERTIARY ORGANIC SULFIDES TO DITERTIARY ORGANIC DISULFIDES

William G. Billings, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed July 19, 1976, Ser. No. 706,421
Int. Cl.[2] C07C *149/12*
U.S. Cl. 260—608 16 Claims

1. A method comprising contacting at least one ditertiary organic sulfide of the formula



wherein each R may be the same or different radical selected from hydrocarbyl radicals having from 1 to 12 carbon atoms, with at least one hydrocarbyl sulfoxide of the formula

wherein each R′ may be the same or different alkyl radical having from 1 to 12 carbon atoms or wherein the two such R′ groups are combined to form a cyclic ring containing the sulfur atom and at least 4 carbons in the cyclic ring, in the presence of a reaction promoting amount of at least one protonic acid, wherein the temperature, the pressure, said at least one ditertiary organic sulfide, said at least one hydrocarbyl sulfoxide and the amounts thereof are such that at least one ditertiary organic disulfide is produced.

4,072,719
4-(2,6,6-TRIMETHYL-2-CYCLOHEXEN-1-YLIDENE)-BUTAN-2-OL

Peter Naegeli, Wettingen, Switzerland, assignor to Givaudan Corporation, Clifton, N.J.

Division of Ser. No. 664,212, March 5, 1976, Pat. No. 4,011,245. This application Oct. 19, 1976, Ser. No. 733,724
Claims priority, application Switzerland, Mar. 11, 1975, 3053/75; Dec. 30, 1975, 16871/75
Int. Cl.[2] C07C *33/05, 33/02*
U.S. Cl. 260—617 A 1 Claim

1. 4-(2,6,6-Trimethyl-2-cyclohexen-1-ylidene)-butan-2-ol.

4,072,720
PRODUCTION OF ALCOHOL

Werner O. Haag, Trenton, and Darrell Duayne Whitehurst, Titusville, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 107,862, Jan. 19, 1971, abandoned, which is a continuation-in-part of Ser. No. 57,796, July 23, 1970, abandoned, and Ser. No. 672,009, Oct. 2, 1967, abandoned, and Ser. No. 860,807, Sept. 24, 1969, abandoned, which is a continuation-in-part of Ser. No. 672,010, Oct. 2, 1967, abandoned, said Ser. No. 57,796, is a continuation-in-part of Ser. No. 672,008, Oct. 2, 1967, abandoned. This application Nov. 5, 1973, Ser. No. 414,612
Int. Cl.[2] C07C *29/14*
U.S. Cl. 260—618 H 20 Claims

1. A process for producing alcohols comprising reacting a reducible aldehyde or an acetal thereof, said aldehyde having about 3 to 13 carbon atoms, corresponding to said alcohol with about 1 to 20 moles of hydrogen per mole of aldehyde or acetal, in the presence of about 0.1 to 20 moles of carbon monoxide per mole of hydrogen at about 50° to 250° C in contact with an intrinsically porous catalyst which is essentially insoluble in the reaction mixture comprising said aldehyde or acetal and the reaction products thereof with hydrogen, which catalyst comprises an organic polymer selected from the group consisting of cellulose, poly(styrene-divinyl benzene), poly(phenol-formaldehyde), poly(melamine-formaldehyde), poly(ureaformaldehyde), poly(alkylene-formaldehyde) and polystyrene having a tertiary amine having a pK_b of 3 to 7 and containing at least one alkyl substituent bonded thereto; and having a metal moiety selected from the group consisting of cobalt, rhodium and ruthenium bonded to said amine.

4,072,721
PURIFICATION OF HYDROQUINONE

Budd Harvey Sturm, Hartville, and Thomas James Slam, Parma, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 13, 1975, Ser. No. 604,273
Int. Cl.[2] C07C *39/08*
U.S. Cl. 260—621 A 7 Claims

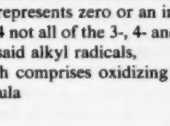
1. In the method of subjecting technical grade hydroquinone to a process which consists of preparing a water solution of technical grade hydroquinone and subsequently treating such water solution with hydrogen at pressures from about 5 to about 150 psig while in the presence of from about 0.1 to about 1 percent by weight of palladium on a support, at temperatures ranging from about 25 to about 125° C. and recovering photographic hydroquinone from said solution which improvement comprising adjusting the pH of the water solution of hydroquinone to a pH between about 3 and about 6.

4,072,722
PROCESS FOR PREPARING DIHYDRIC PHENOL DERIVATIVES

Sumio Umemura; Nagaaki Takamitsu; Toshikazu Hamamoto, and Nobuyuki Kuroda, all of Ube, Japan, assignors to UBE Industries, Ltd., Ube, Japan

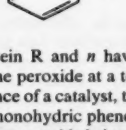
Continuation of Ser. No. 558,699, March 17, 1975, abandoned. This application Nov. 29, 1976, Ser. No. 745,556
Claims priority, application Japan, Apr. 4, 1974, 49-37319; May 7, 1974, 49-49812
Int. Cl.[2] C07C *39/08*
U.S. Cl. 260—621 G 11 Claims

1. A process for preparing a dihydric phenol having the formula:



wherein R represents a lower alkyl radical having 1–6 carbon atoms and each R may be the same or different, and *n* represents zero or an integer of 1 to 4 and when *n* is 3 or 4 not all of the 3-, 4- and 6-positions are occupied with the said alkyl radicals,

which comprises oxidizing a monohydric phenol having the formula



wherein R and *n* have the same meanings as above, with a ketone peroxide at a temperature of from 45° to 200° C. in the absence of a catalyst, the amount of peroxide P per millimole of the monohydric phenol being a value of from 0.01 to 0.50, said ketone peroxide being obtained by reaction of hydrogen peroxide and a ketone selected from the group consisting of (i) and (ii), following:

i. a ketone having 3–20 carbon atoms represented by the following formula:

$R_1—CO—R_2$

wherein R_1 and R_2, which may be the same or different, and which represent straight or branched alkyl groups of 1–8 carbon atoms or a phenyl group, or

ii. a cycloketone having the following formula:

wherein n_1 represents an integer of 4–11, inclusive,

or a ketone peroxide derived from a secondary alcohol having the following formula:

iii. a secondary alcohol having 3–20 carbon atoms and represented by the following formula:

wherein R and R have the same meanings as above.

4,072,723

PREPARATION OF 2,3,6-TRI-LOWER ALKYL PHENOLS

Pius Anton Wehrli, Verona, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

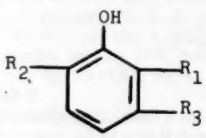
Division of Ser. No. 260,024, June 2, 1972, Pat. No. 3,857,892, which is a division of Ser. No. 805,365, March 7, 1969, Pat. No. 3,692,839. This application Aug. 28, 1974, Ser. No. 501,128

Published under the second Trial Voluntary Protest Program on Feb. 24, 1976, as document No. B 501,128.

Int. Cl.² C07C *39/06*

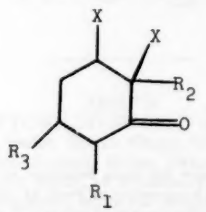
U.S. Cl. 260—621 H **1 Claim**

1. A process of producing a hydroxy compound of the formula:



wherein R_1, R_2 and R_3 are lower alkyl;

comprising treating a compound of the formula:



wherein R_1, R_2 and R_3 are as above;

with a dehydrogenating agent selected from the group consisting of dichlorodicyanoquinone, mercuric acetate, and palladium on carbon, said treatment being carried out in the presence or absence of an inert organic solvent and at a temperature of from about 25°C. to about 300°C.

4,072,724

PROCESS FOR PREPARING HINDERED ALKENYL PHENOLS

Dane K. Parker, Massillon, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 3, 1975, Ser. No. 628,686

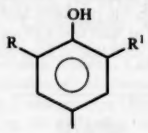
Int. Cl.² C07C *39/18, 39/12*

U.S. Cl. 260—624 B **9 Claims**

1. A process of preparing a hindered alkenyl phenol comprising reacting (a) an α-haloalkyl phenol with (b) a basic dehydrohalogenation agent, wherein the α-haloalkyl phenol has the following structural formula

and the hindered alkenyl phenol has the following structural formula

wherein A has the structure



and wherein R and R^1 are tertiary alkyl radicals having 4 to 12 carbon atoms, R^2 is selected from the group consisting of hydrogen and methyl, R^3 is selected from the group consisting of hydrogen, alkyl radicals having 1 to 6 carbon atoms and aryl radicals having 6 to 12 carbon atoms, with the proviso that at least one of R^2 and R^3 is hydrogen, and X is a halo radical selected from the group consisting of chloro, bromo and iodo.

4,072,725

DEHYDROPHYTOL

Ralph E. Close, Jacksonville, Fla., and William Oroshnik, Plainfield, N.J., assignors to SCM Corporation, New York, N.Y.

Division of Ser. No. 622,974, Oct. 16, 1975, Pat. No. 4,039,591, which is a division of Ser. No. 560,550, March 20, 1975. This application Feb. 22, 1977, Ser. No. 770,413

Int. Cl.² C07C *33/02*

U.S. Cl. 260—632 R **1 Claim**

1. The compound 3,7,11,15-tetramethylhexadeca-2,5-dien-1-ol.

4,072,726

HYDROGENATION OF FLUORINATED ESTERS

Henry Robert Nychka, East Aurora; Richard Elmer Eibeck, Orchard Park; Martin Alvin Robinson, East Amherst, and Edward Stephen Jones, Williamsville, all of N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Jan. 21, 1977, Ser. No. 761,160

Int. Cl.² C07C *31/34, 29/00*

U.S. Cl. 260—633 **18 Claims**

1. A method for the preparation of fluorinated alcohols of the formula $C_nH_xF_{2n+1-x}CH_2OH$, wherein $n=1$ to 13 and $x=0$ to 3 but not more than n, comprising passing at between about 200° C and about 325° C a vaporous mixture of hydrogen and a fluorinated ester of the formula $C_nH_xF_{2n+1-x}CO_2CH_2—C_mH_yF_{2m+1-y}$, wherein n and x are as described above and $m=1$ to 13 and $y=0$ to 3 but not more than m, over a catalyst consisting essentially of about 50 to 100 percent by weight

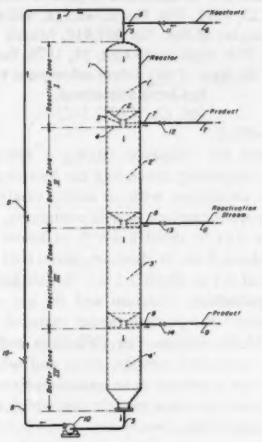
CuO and 0 to about 50 percent by weight of an inert base or binder, said catalyst being essentially free of chromite, and recovering the fluorinated alcohol.

4,072,727

SILVER-CADMIUM-ZINC ALLOY CATALYST FOR HYDROGENATION OF ACROLEIN TO ALLYL ALCOHOL

Thomas H. Vanderspurt, Gillette, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Aug. 13, 1976, Ser. No. 714,057
Int. Cl.[2] C07C *29/14;* B01J *23/60*
U.S. Cl. 260—638 B **10 Claims**



1. A catalyst composition consisting essentially of a silver-cadmium-zinc alloy on a carrier substrate, wherein the atomic ratio of silver to cadmium in the alloy is in the range of between about 0.1 and 3 to 1, and the zinc is contained in the alloy in a quantity between about 0.001 and 30 weight percent, based on the total weight of alloy, and wherein the silver-cadmium-zinc alloy exhibits an X-ray diffraction pattern which is substantially free of detectable unalloyed metal crystallite lines.

10. An improved hydrogenation process for converting acrolein into allyl alcohol which comprises reacting acrolein with hydrogen in the vapor phase at a temperature between about 0° C and 300° C and a pressure between about 15 and 15,000 psi in the presence of a silver-cadmium-zinc alloy on a carrier substrate, wherein the atomic ratio of silver to cadmium in the alloy is in the range of between about 0.1 and 3 to 1, and the zinc is contained in the alloy in a quantity between about 0.001 and 30 weight percent, based on the total weight of alloy, and wherein the silver-cadmium-zinc alloy exhibits an X-ray diffraction pattern which is substantially free of detectable unalloyed metal crystallite lines.

4,072,728

PROCESS FOR THE PREPARATION OF 1,2-DICHLOROETHANE IN TWO REACTION ZONES BY REACTING CHLORINE WITH NOT MORE THAN 102 MOLE PERCENT OF ETHYLENE

Jean-Raymond Costes, Dampierre; Jean-Claude Strini, St-Auban, and Serge Hardouin, Lyon, all of France, assignors to Rhone-Progil, France

Continuation of Ser. No. 427,375, Dec. 21, 1973, abandoned. This application Sept. 29, 1975, Ser. No. 617,409
Claims priority, application France, Dec. 27, 1972, 72.46389
Int. Cl.[2] C07C *17/02, 17/10*
U.S. Cl. 260—660 **9 Claims**

1. In a process for the production of 1,2-dichloroethane in which chlorine and ethylene are reacted at a temperature within the range of 20° to 80° C in the absence of light radiation and in the presence of a Lewis acid catalyst and liquid 1,2-dichloroethane, the improvement comprising continuously introducing to a first homogeneous agitated reaction zone of 1,2-dichloroethane all of the chlorine used in the reaction and a fraction of the total ethylene within the range of 90 to 100 mole percent based on the total amount of chlorine, immediately passing the resulting products from the first zone to a second homogeneous, agitated reaction zone, introducing to the second zone the remaining ethylene countercurrently to the flow of 1,2-dichloroethane, with the total amount of ethylene introduced to the first and second zones not exceeding 102 mole percent of the total chlorine used and with both reaction zones being included in a single vessel, and recovering 1,2-dichloroethane from the second zone while venting not more than 1 mole percent of the ethylene based upon the total amount of ethylene introduced.

4,072,729

SIMULATED MOVING BED REACTION PROCESS

Laurence O. Stine, Western Springs, and Dennis J. Ward, South Barrington, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 587,468, June 16, 1975, Pat. No. 4,028,430. This application Feb. 7, 1978, Ser. No. 768,510
Int. Cl.[2] C07C *3/52*
U.S. Cl. 260—671 R **17 Claims**

1. A continuous fixed bed catalytic alkylation reaction and catalyst reactivation process comprising the steps of:

a. providing a fixed bed of solid catalyst containing four zones having a fluid flow connecting path between said zones to interconnect said zones;

b. arranging said zones in a series and providing fluid flow connecting means between the last zone and the first zone of the series to provide a directional circular flow path through said zones;

c. providing a point between each two successive zones for introducing an inlet stream or withdrawing a product stream;

d. introducing a reactivation stream including alkylatable aromatic hydrocarbon at first point located between two successive zones (zone II and zone III) to effect catalyst reactivation and to provide alkylatable hydrocarbon as a continuous component throughout said fixed bed of solid catalyst;

e. simultaneously withdrawing a first product stream from a second point located between said zone III and the next successive zone in the direction of flow (zone IV);

f. simultaneously introducing reactants including an olefin-acting reactant selected from the group consisting of ethylene, propylene and C_9 –C_{15} mono-olefins into said fixed bed of catalyst at a third point located between said zone IV and the next successive zone in the direction of flow (zone I) and reacting said reactants at a temperature of about 200° to about 600° F. to effect an alkylation reaction, a result of which is deactivation of said catalyst, said alkylation and catalyst reactivation being the principal reactions of the process;

g. simultaneously withdrawing a second product stream from a fourth point located between said zone I and the next successive zone in the direction of flow (zone II); and,

h. periodically advancing downstream the points of charging said reactants stream and said reactivation stream, and the points of withdrawal of said product streams to the next successive points for introducing an inlet stream or withdrawing an outlet stream.

2. A continuous fixed bed catalytic alkylation reaction and catalyst reactivation process comprising the steps of:

a. providing a fixed bed of solid catalyst containing three zones having a fluid flow connecting path between said zones to interconnect said zones;

b. arranging said zones in a series and providing fluid flow

connecting means between the last zone and the first zone of the series to provide a directional circular flow path through said zones;

c. providing a point between each two successive zones for introducing an inlet stream or withdrawing a product stream;

d. introducing a reactivation stream including alkylatable aromatic hydrocarbon at a first point located between two successive zones to effect catalyst reactivation and to provide alkylatable hydrocarbon as a continuous component throughout said fixed bed of solid catalyst;

e. simultaneously withdrawing a first product stream from a second point located between another two successive zones;

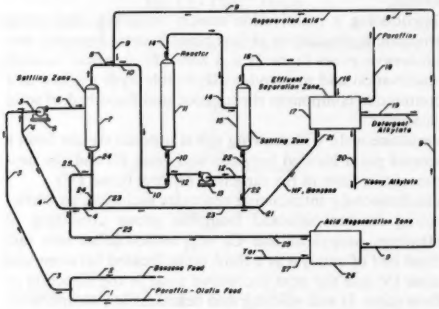
f. simultaneously introducing reactants including an olefin-acting reactant selected from the group consisting of ethylene, propylene and C_9 -C_{15} mono-olefins into said fixed bed of catalyst at a third point located between the remaining two successive zones and reacting said reactants at a temperature of about 200° to about 600° F to effect an alkylation reaction, a result of which is deactivation of said solid catalyst, said aromatic alkylation and catalyst reactivation being the principal reactions of the process; and,

g. periodically advancing downstream the points of charging said reactants stream and said reactivation stream, and the point of withdrawal of said product stream to the next successive points for introducing an inlet stream or withdrawing an outlet stream.

4,072,730
PROCESS FOR ALKYLATING AROMATIC HYDROCARBONS

George R. Winter, III, Mount Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Dec. 28, 1976, Ser. No. 754,927
Int. Cl.[2] C07C *3/54*
U.S. Cl. 260—671 R 5 Claims



1. In the alkylation of an aromatic hydrocarbon with an olefinic hydrocarbon in contact with hydrogen fluoride catalyst, wherein the resultant reaction mixture is separated in a settling zone into a hydrocarbon phase and a liquid hydrogen fluoride phase, at least a portion of which is recirculated by a centrifugal pump to the alkylation reaction, the improvement which comprises introducing the aromatic and olefinic hydrocarbons to be reacted into the centrifugal pump and therein admixing the same with hydrogen fluoride to partially alkylate said aromatic hydrocarbon with said olefin hydrocarbon, discharging the pump effluent through a restricted transfer line into said settling zone, and continuing the aromatic alkylation during the passage of the pump effluent through said transfer line to the settling zone.

2. The improvement of claim 1 further characterized in that said hydrocarbon phase from the settling zone is admixed with additional hydrogen fluoride catalyst, the mixture maintained at alkylation promoting conditions and thereafter separated into a hydrocarbon phase and a hydrogen fluoride phase, and at least a portion of the latter supplied to said centrifugal pump.

4,072,731
DEHYDROCYCLIZATION WITH AN ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

Richard E. Rausch, Mundelein, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 568,543, April 16, 1975, Pat. No. 3,986,948, which is a continuation-in-part of Ser. No. 480,793, June 19, 1974, Pat. No. 3,898,154, which is a continuation-in-part of Ser. No. 376,841, July 5, 1973, Pat. No. 3,846,283, which is a continuation-in-part of Ser. No. 201,576, Nov. 23, 1971, Pat. No. 3,745,112, which is a continuation-in-part of Ser. No. 807,910, March 17, 1969, Pat. No. 3,740,328. This application Oct. 18, 1976, Ser. No. 734,474 The portion of the term of this patent subsequent to Aug. 5, 1992, has been disclaimed.
Int. Cl.[2] C07C *5/22*
U.S. Cl. 260—673.5 21 Claims

1. A method for dehydrocyclizing a dehydrocyclizable hydrocarbon comprising contacting the hydrocarbon at dehydrocyclization conditions with an acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.01 to about 5 wt. % tin and about 0.1 to about 3.5 wt. % halogen; wherein the platinum or palladium, rhodium and tin are uniformly dispersed throughout the porous carrier material; wherein substantially all of the platinum or palladium and rhodium are present in the elemental metallic state; and wherein substantially all of the tin is present in an oxidation state above that of the elemental metal and in a particle size which is less than 100 Angstroms in maximum dimension.

4,072,732
CONVERSION OF METHANOL AND DIMETHYL ETHER TO C_2-C_6 MONOOLEFINS USING A PARTIALLY HYDRATED ZIRCONIUM SULFATE CATALYST

Duane C. Hargis, Southfield, and Lawrence J. Kehoe, Huntington Woods, both of Mich., assignors to Ethyl Corporation, Richmond, Va.

Filed Apr. 2, 1976, Ser. No. 672,846
Int. Cl.[2] C07C *1/20*
U.S. Cl. 260—682 6 Claims

1. A process for the conversion of a reactant selected from the class consisting of methanol and dimethyl ether to C_2-C_6 monoolefin, said process comprising contacting said reactant with a partially hydrated zirconium sulfate catalyst at a temperature within the range of about 200° C. to about 400° C.

4,072,733
CONVERSION OF METHANOL AND DIMETHYL ETHER

Duane C. Hargis, Southfield, and Lawrence J. Kehoe, Huntington Woods, both of Mich., assignors to Ethyl Corporation, Richmond, Va.

Filed Apr. 2, 1976, Ser. No. 672,847
Int. Cl.[2] C07C *1/24*
U.S. Cl. 260—682 6 Claims

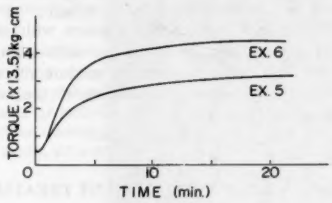
1. Process for conversion of methanol, dimethyl ether, or a mixture of methanol and dimethyl ether, comprising contacting said methanol, dimethyl ether or a mixture of methanol and dimethyl ether with a catalyst at a temperature of from about 200° to about 400° C. to convert said methanol, dimethyl ether or mixture of methanol and dimethyl ether to a higher hydrocarbon having two or more carbon atoms, said catalyst comprising partially hydrated aluminum sulfate.

4,072,734

CURED OR UNCURED COMPOSITIONS OF HOMOPOLYMERS AND COPOLYMERS OF EPIHALOHYDRINS

Tetsuya Nakata, Ibaragi; Nobuo Yamada, Amagasaki; Akira Hashimoto, Itami; Yasuto Takata, and Yukinari Bunnomori, both of Amagasaki, all of Japan, assignors to Osaka Soda Co. Ltd., Osaka, Japan

Filed Sept. 12, 1975, Ser. No. 612,759
Claims priority, application Japan, Aug. 6, 1975, 50-96203
Int. Cl.[2] C08G *65/32*
U.S. Cl. 260—873 21 Claims



1. In a cured or uncured composition consisting essentially of:

I. a polymer which is

A. an epihalohydrin homopolymer, or

B. an epihalohydrin copolymer consisting essentially of:

1. at least 5 mol% of an epihalohydrin monomer; and

2. the remainder being at least one monomer selected from the group consisting of an epihalohydrin other than (1), copolymerizable epoxides other than epihalohydrin, and 5-membered dicarboxylic acid anhydrides;

II. a second polymer blended with polymer I present in 0% to 50% by weight, based on the weight of polymer I, and being selected from at least one member of the group consisting of polychloroprene, polyvinyl chloride, chlorinated polyethylene and acrylic ester-chloroethylvinyl ether copolymer; and

III. a curing amount of a 1,8-diazabicyclo(5,4,0(undecene-7 containing curing agent and a metal compound acid acceptor;

the improvement wherein component III comprises, on a basis of 100 parts by weight, of polymer I:

A. a curing agent consisting of a curing agent which is free from cyclic carboxylic acid anhydride and which is a member selected from the group consisting of

1. from about 1 to 200 parts by weight of an acid salt of (i) 1 mole of polycarboxylic acid with (ii) 1 mole of 1,8-diazabicyclo(5,4,0)undecene-7;

2. 1 to 10 parts by weight of a cyanuric acid salt of 1,8-diazabicyclo(5,4,0)undecene-7; and

3. a mixture of (i) 1 to 200 parts by weight of a polybasic carboxylic acid and (ii) 1 to 10 parts by weight of a neutral salt of 1,8-diazabicyclo(5,4,0)undecene-7; and

B. an acid acceptor comprising from about 1 to 20 parts by weight of at least one metal compound selected from the group consisting of: the oxide, hydroxide, carbonate, silicate, phosphate and carboxylic acid salt of a metal of Group II of the Periodic Table of elements; or the oxide, basic carbonate, basic carboxylic acid salt and basic phosphite of a metal of Group IV-A of the Periodic Table of elements.

4,072,735

HOT MELT PRESSURE SENSITIVE ADHESIVES

Loyce A. Ardemagni, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed June 3, 1976, Ser. No. 692,404
Int. Cl.[2] C08L *23/16*
U.S. Cl. 260—897 A 9 Claims

1. An adhesive composition capable of being used as a hot melt pressure sensitive adhesive comprising a blend of

1. 5 to 15 weight percent ethylene-propylene rubber,

2. 30 to 60 weight percent of at least one tackifying resin selected from the group consisting of hydrocarbon tackifier resins, polyterpene resins, and rosin esters, and

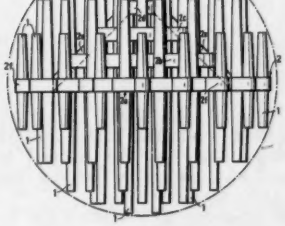
3. 20 to 50 weight percent polybutylene.

4,072,736

PACKING MATERIAL

Volker Fattinger, Arlesheim, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 563,909, March 31, 1975, abandoned. This application Oct. 15, 1976, Ser. No. 732,639
Claims priority, application Switzerland, Apr. 5, 1974, 4844/74
Int. Cl.[2] B01F *3/04*
U.S. Cl. 261—97 4 Claims



1. A packing material unit for positioning in bulk or random relationship within a liquid-gas contact apparatus in order to enlarge the contacting surface of a liquid and a gas flowing through said apparatus, said unit comprising a carrier consisting of rings of staggered diameter which are arranged parallel to each other and spaced apart coaxially, and a plurality of rods positioned on said rings extending from two opposite sides of said carrier and arranged substantially parallel to each other and at least approximately evenly distributed over the whole surface of a cross sectional area perpendicular to said rods, said cross sectional area being of substantially circular or elliptical shape, the length of said rods decreasing from the center of said cross sectional area towards the periphery thereof in such a manner that the unit is substantially spherical or spheroidal.

4,072,737

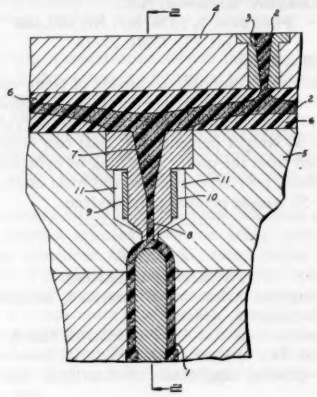
METHOD FOR PRODUCTION OF HOLLOW ARTICLES FROM INJECTION MOLDED PREFORMS USING INSULATED RUNNER SYSTEM

William D. Wolf, Simsbury, Conn., assignor to Monsanto Company, St. Louis, Mo.

Filed Feb. 27, 1976, Ser. No. 662,141
Int. Cl.[2] B29C *17/07*
U.S. Cl. 264—97 10 Claims

1. In the method for the production of hollow articles by thermoforming tubular, elongated reheated injection molded preforms made of thermoplastic material the improvement comprising injection molding said preforms using a mold distribution system having an insulated runner with walls approaching the glass transition temperature of the thermoplastic

material, said runner connecting an inlet sprue with one or more externally heated orifice gate channels, the thermoplastic



material in such channels being above its glass transition temperature.

4,072,738

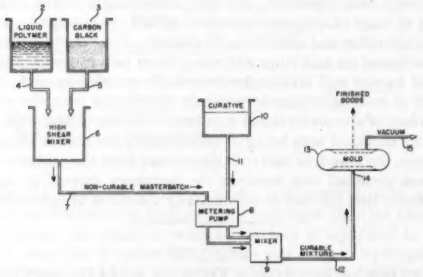
METHOD OF FORMING SHAPED ARTICLES

Robert M. Pierson, Hudson, and John A. Lovell, Munroe Falls, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 198,762, Nov. 15, 1971, abandoned, which is a continuation-in-part of Ser. No. 722,918, April 22, 1968, abandoned. This application Feb. 12, 1975, Ser. No. 549,421

Int. Cl.[2] B29C *5/00;* **B29G** *3/00*

U.S. Cl. 264—102 **6 Claims**



1. In a method of forming a shaped article comprising mixing a liquid polymer containing functional end groups with a suitable compounding agent that yields a mixture capable of Newtonion flow at the mixing temperature and moving the mixture under a pressure differential of 10 to 3000 pounds per square inch to a shaper and curing, the improvement wherein the mixture is subjected to mixing in a vacuum in a high shear mixer to convert the mixture from a Newtonion to a non-Newtonion mixture at the mixing temperature, mixing a curative in the non-Newtonion mixture and moving the mixture to shaper at a viscosity at the mixing temperature expressed as 100,000 to 750,000 poises at 60° C.

4,072,739

PROCESS FOR THE REMOVAL OF URANIUM CONTAINED IN HOMO- AND CO-POLYMERS OF MONO- AND DIOLEFINES

Alessandro Béranger; Agostino Balducci, and Silvano Gordini, all of San Donato Milanese, Italy, assignors to Snamprogetti, S.p.A., Milan, Italy

Filed Aug. 1, 1975, Ser. No. 601,205

Claims priority, application Italy, Aug. 2, 1974, 25940/74

Int. Cl.[2] B01D *11/04*

U.S. Cl. 423—8 **5 Claims**

1. The process of removing the uranium contained in a hydrocarbon solution of polybutadiene prepared in the presence of a catalyst system including tetrallyl uranium or tetramethoxyl uranium, a reducing compound of a metal belonging to the 2nd or 3rd groups of the Periodic System and a Lewis acid, in a hydrocarbon solvent, which comprises thoroughly mixing said hydrocarbon solution with an aqueous solution of ammonium carbonate at a concentration of from 1 to about 5%, and then separating said mixture into an organic phase and an aqueous phase containing all the uranium removed from said butadiene.

4,072,740

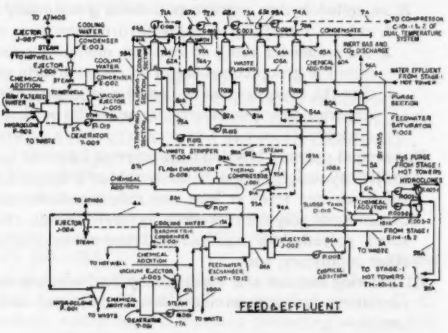
PROCESS FEED AND EFFLUENT TREATMENT SYSTEMS

Jerome S. Spevack, New Rochelle, N.Y., assignor to Deuterium Corporation, White Plains, N.Y.

Division of Ser. No. 489,449, July 17, 1974, Pat. No. 3,984,518, which is a continuation of Ser. No. 126,498, March 22, 1971, abandoned. This application Feb. 13, 1976, Ser. No. 658,058

Int. Cl.[2] C01B *17/16, 5/02*

U.S. Cl. 423—563 **5 Claims**



1. An improved process for treatment of the liquid water feed and effluent of a gas and liquid contact system, in which system a flow of gas consisting essentially of hydrogen sulfide previously saturated with water vapor and a flow of liquid consisting essentially of water previously saturated with hydrogen sulfide are contacted with each other at elevated temperature and pressure, and from which system a purge stream of said gas is discharged, said water feed contains dissolved minerals of heavy metal capable of conversion to insoluble sulfides and being essentially free of hydrogen sulfide, which treatment process comprises:

(a) treating said water feed prior to its introduction into said system by

(1) heating the water feed by transferring heat thereto from said effluent,

(2) reacting hydrogen sulfide with said dissolved minerals to precipitate insoluble sulfides therefrom,

(3) dissolving hydrogen sulfide in the so heated water feed to an amount essentially corresponding to saturation at said elevated temperature and pressure by countercur-

rent contact of said heated water feed with said purge stream essentially at said elevated pressure, and

(4) seperating said insoluble sulfides from said water feed,

(b) introducing the so treated water feed into said gas and liquid contact system,

(c) treating said precipitated solid sulfides chemically to form hydrogen sulfide therefrom, and

(d) separately removing and returning to said contact system hydrogen sulfide gas formed in step (c).

4,072,741

METHOD OF CONTROLLING THE GROWTH OF BACTERIA AND FUNGI USING N-HYDROXYMETHYLALKYLENE DIAMINES

Jerry Hoyt Hunsucker, Terre Haute, Ind., assignor to IMC Chemical Group, Inc., Terre Haute, Ind.

Filed Dec. 17, 1976, Ser. No. 752,213

Int. Cl.[2] A01N *9/20*

U.S. Cl. 424—325 **5 Claims**

1. A method of controlling the growth of bacteria and fungi comprising applying to them or to the environment inhabited by them a growth-inhibiting amount of an N-hydroxymethylalkylene diamine, the alkylene group having from 2 to 4 carbon atoms, or a mixture thereof.

4,072,742

ALUMINUM DERIVATIVES OF 2-PYRIDYL THIOL N-OXIDE, PROCESS FOR PREPARING THE SAME AND ANTIPERSPIRANT-DEODORANT COMPOSITION CONTAINING THE SAME

Claude Bouillon, Eaubonne, and Georges Rosenbaum, Asnieres, both of France, assignors to L'Oreal, Paris, France

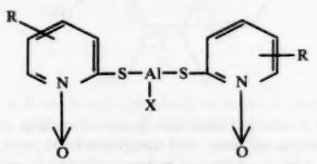
Division of Ser. No. 294,072, Oct. 2, 1972, Pat. No. 3,953,450. This application Nov. 26, 1975, Ser. No. 635,441

Claims priority, application Luxembourg, May 12, 1972, 65350

Int. Cl.[2] A61K *31/555, 7/38;* **C07D** *213/89*

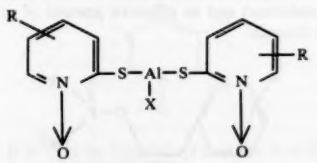
U.S. Cl. 424—47 **17 Claims**

1. An antiperspirant-deodorant composition comprising in a cosmetic carrier as the active compound to inhibit perspiration and the formation of body odor, an effective amount of a compound having the formula



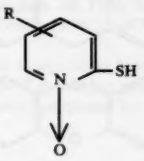
wherein X is selected from the group consisting of chlorine, bromine and R_1SO_3 wherein R_1 is selected from the group consisting of alkyl having from 1 to 4 carbon atoms, phenyl, p-chlorophenyl, p-hydroxyphenyl and 2-oxo 10-bornanyl, and R represents a member selected from the group consisting of chlorine, methyl and methoxy.

14. A compound of the formula



wherein X is R_1SO_3 wherein R_1 represents a member selected from the group consisting of alkyl having from 1 to 4 carbon atoms, phenyl, p-methylphenyl, p-chlorophenyl, p-hydroxyphenyl and 2-oxo 10-bornanyl radical and R represents a member selected from the group consisting of chlorine, methyl and methoxy.

16. A process for preparing a compound of claim 14 comprising reacting in an anhydrous solvent selected from the group consisting of methanol, ethanol, isopropanol, tertiobutyl alcohol, benzene, toluene, chloroform and dichlorethane, a 2-pyridine thiol N-oxide of the formula



wherein R represents a member selected from the group consisting of hydrogen, chlorine, methyl and methoxy, with aluminum isopropylate and reacting the resulting reaction product with sulfonic acid having the formula R_1SO_3H wherein R_1 represents a member selected from the group consisting of alkyl having 1–4 carbon atoms, phenyl, p-methylphenyl, p-chlorophenyl, p-hydroxyphenyl and 2-oxo 10-bornanyl.

4,072,743

N^2-ARYLSULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Shosuke Okamoto, 15-1i, Asahigaoka 3-chome, Tarumi, Kobe, Hyogo, Japan; Akiko Hijikata, Kobe, Japan; Ryoji Kikumoto, Machida, Japan; Yoshikuni Tamao, Yokohama, Japan; Kazuo Ohkubo, Machida, Japan; Tohru Tezuka, Yokohama, Japan, and Shinji Tonomura, Tokyo, Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo and Shosuke Okamoto, both of, Japan

Continuation-in-part of Ser. No. 669,743, March 24, 1976, which is a continuation-in-part of Ser. No. 671,568, March 29, 1976, which is a continuation-in-part of Ser. No. 622,390, Oct. 14, 1975, abandoned. This application Jan. 19, 1977, Ser. No. 760,744

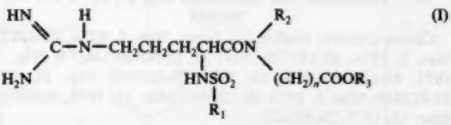
Claims priority, application Japan, Nov. 8, 1974, 49-128774; Nov. 8, 1974, 49-128775; Nov. 29, 1974, 49-136695; Nov. 29, 1974, 49-136697; Feb. 25, 1975, 50-023268; Feb. 26, 1975, 50-023635

The portion of the term of this patent subsequent to Jan. 24, 1995, has been disclaimed.

Int. Cl.[2] A61K *37/00;* **C07C** *103/52*

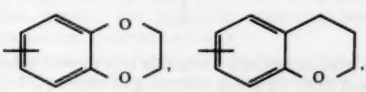
U.S. Cl. 424—177 **12 Claims**

1. N^2-arylsulfonyl-L-argininamides having the formula (I):



(I)

and the pharmaceutically acceptable salts thereof, wherein R_1 is selected from the group consisting of naphthyl, 5,6,7,8-tetrahydronaphthyl, naphthyl substituted with at least one substituent selected from the group consisting of halo, nitro, cyano, hydroxy, C_1–C_{10} alkyl and C_2–C_{20} dialkylamino, phenyl, phenyl substituted with at least one substituent selected from the group consisting of halo, nitro, cyano, hydroxy, C_1–C_{10} alkyl, C_1–C_{10} alkoxy and C_2–C_{20} dialkylamino, C_7–C_{12} aralkyl,



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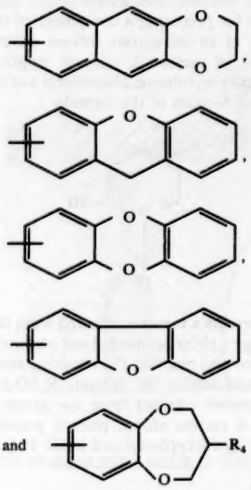


wherein R_4 is hydrogen, C_1-C_{10} alkyl or C_1-C_{10} alkoxy; R_2 is selected from the group consisting of C_2-C_{10} alkyl, C_3-C_{10} alkenyl, C_3-C_{10} alkynyl, C_2-C_{10} alkoxyalkyl, C_2-C_{10} alkylthioalkyl, C_2-C_{10} alkylsulfinylalkyl, C_1-C_{10} hydroxyalkyl, C_2-C_{10} carboxyalkyl, C_3-C_{10} alkoxycarbonylalkyl, C_1-C_{10} haloalkyl, C_7-C_{15} aralkyl, C_8-C_{15} α-carboxyaralkyl, C_3-C_{10} cycloalkyl and C_4-C_{10} cycloalkylalkyl; R_3 is hydrogen; and *n* is an integer of 1, 2 or 3.

4,072,744

N²-NAPHTHALENESULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Shosuke Okamoto, 15-1i, Asahigaoka 3-chome, Tarumi, Kobe, Hyogo, Japan; Akiko Hijikata, Kobe, Japan; Ryoji Kikumoto, Machida, Japan; Yoshikuno Tamao, Yokohama, Japan; Kazuo Ohkubo, Machida, Japan; Tohru Tezuka, Yokohama, Japan, and Shinji Tonomura, Tokyo, Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo and Shosuke Okamoto, both of, Japan

Continuation-in-part of Ser. No. 669,743, March 24, 1976, which is a continuation-in-part of Ser. No. 671,568, March 29, 1976, which is a continuation-in-part of Ser. No. 622,390, Oct. 14, 1975, abandoned. This application Jan. 19, 1977, Ser. No. 760,585

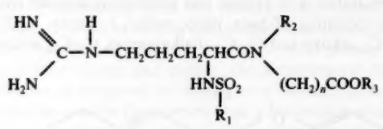
Claims priority, application Japan, Nov. 8, 1974, 49-128774; Nov. 8, 1974, 49-128775; Nov. 29, 1974, 49-136695; Nov. 29, 1974, 49-136697; Feb. 25, 1975, 50-023268; Feb. 26, 1975, 50-023635; Mar. 5, 1975, 50-026768; Mar. 11, 1975, 50-029357; Mar. 11, 1975, 50-029358

The portion of the term of this patent subsequent to Jan. 24, 1995, has been disclaimed.

Int. Cl.² A61K *37/00*; C07C *103/52*

U.S. Cl. 424—177 **11 Claims**

1. N^2-naphthalenesulfonyl-L-arginamides having the formula (I):



(I)

and the pharmaceutically acceptable salts thereof, wherein R_1 is selected from the group consisting of naphthyl, 5,6,7,8-tetrahydronaphthyl and naphthyl substituted with at least one substituent selected from the group consisting of halo, hydroxy, C_1-C_{10} alkyl and C_2-C_{20} dialkylamino; R_2 is selected from the group consisting of C_2-C_{10} alkyl, C_2-C_{10} alkoxyalkyl, C_2-C_{10} alkylthioalkyl, C_7-C_{15} aralkyl, C_3-C_{10} cycloalkyl and C_4-C_{10} cycloalkylalkyl; R_3 is hydrogen; and n is an integer of 1, 2 or 3.

4,072,745

SUBSTITUTED VINYL THIOPHOSPHATE ACTIVATORS

Leland S. Pitt, Greenville, Miss., and George B. Large, Orinda, Calif., assignors to Stauffer Chemical Company, Westport, Conn.

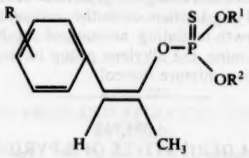
Filed Mar. 11, 1976, Ser. No. 665,987

The portion of the term of this patent subsequent to May 27, 1992, has been disclaimed.

Int. Cl.² A01N *9/36*

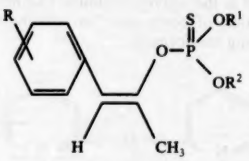
U.S. Cl. 424—200 **32 Claims**

1. A compound having the formula



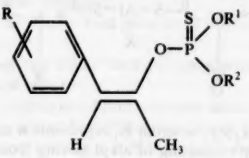
wherein R is selected from the group consisting of chlorine, trifluoromethyl, methoxy, and methylenedioxy; and R^1 and R^2 can be the same or different and are selected from the group consisting of lower alkyl having from 1 to 4 carbon atoms, inclusive.

9. An insecticidally active composition comprising an insecticidally effective amount of an insecticide defined as N-(mercaptomethyl) phthalimide S-(O,O-dimethylphosphorodithioate) and an effective amount of an activator having the formula



wherein R is selected from the group consisting of chlorine, trifluoromethyl, methoxy, and methylenedioxy, and R^1 and R^2 can be the same or different and are selected from the group consisting of lower alkyl having from 1 to 4 carbon atoms, inclusive; said activator being present in an amount ranging between 0.1 and 10 parts by weight per each part by weight insecticide.

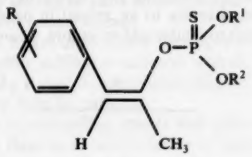
17. A method of controlling insects comprising applying to the habitat thereof an insecticidally effective amount of an insecticidally active composition comprisng an insecticide defined as N-(mercaptomethyl) phthalimide S-(O,O-dimethyl phosphorodithioate) and an effective amount of an activator having the formula



wherein R is selected from the group consisting of chlorine,

trifluoromethyl, methoxy, and methylenedioxy; and R^1 and R^2 can be the same or different and are selected from the group consisting of lower alkyl having from 1 to 4 carbon atoms, inclusive; said activator being present in an amount ranging between 0.1 and 10 parts by weight per each part by weight insecticide.

25. An insecticidally active composition comprising an inert diluent carrier, an insecticidally effective amount of an insecticide defined as N-(mercaptomethyl) phthalimide S-(O,O-dimethylphosphorodithioate) and an effective amount of an activator having the formula



wherein R is selected from the group consisting of chlorine, trifluoromethyl, methoxy, and methylenedioxy; and R^1 and R^2 can be the same or different and are selected from the group consisting of lower alkyl having from 1 to 4 carbon atoms, inclusive; said activator being present in an amount ranging from between 0.1 and 10 parts by weight per each part by weight insecticide.

4,072,746
3-AMINO-5-(PYRIDINYL)-2(1H)-PYRIDINONES

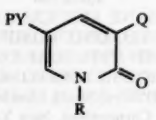
George Y. Lesher, East Greenbush, and Chester J. Opalka, Jr., Schodack, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of Ser. No. 621,763, Oct. 14, 1975, Pat. No. 4,004,012. This application July 21, 1976, Ser. No. 707,235

Int. Cl.² A61K *31/44;* C07D *213/56*

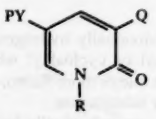
U.S. Cl. 424—263 **21 Claims**

1. A 1-R-3-Q-5-PY-2 (1H)-pyridinone having the formula



where PY is 4- or 3- or 2-pyridinyl or 4- or 3- or 2-pyridinyl having one or two lower-alkyl substituents, R is hydrogen, lower-alkyl or lower-hydroxyalkyl and Q is nitro, amino, lower-alkylamino di-(lower-alkyl)amino, or NHAc where Ac is lower-alkanoyl or lower-carbalkoxy, or pharmaceutically-acceptable acid-addition salt thereof.

16. The method for increasing cardiac contractility in a patient requiring such treatment which comprises administering orally or parenterally in a solid or liquid dosage form to such patient an effective amount of a cardiotonic 1-R-3-Q-5-PY-2 (1H)-pyridinone having the formula



where PY is 4- or 3- or 2-pyridinyl or 4- or 3- or 2-pyridinyl having one or two lower-alkyl substituents, R is hydrogen, lower-alkyl or lower-hydroxyalkyl and Q is amino, lower-alkylamino, di-(lower-alkyl) amino or NHAc where Ac is lower-alkanoyl or lower-carbalkoxy, or pharmaceutically acceptable acid-addition salt thereof.

4,072,747
DERIVATIVES OF 1,2-DIPHENYL-3,5-DIOXO-4-N-BUTYL-PYRAZOLIDINE AND PROCESS FOR MAKING SAME

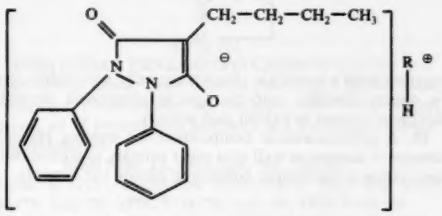
David J. Roberts, and Jacinto Moragues Mauri, both of Barcelona, Spain, assignors to Antonio Gallardo, S.A., Barcelona, Spain

Division of Ser. No. 448,748, March 6, 1974, Pat. No. 3,994,910. This application Sept. 10, 1976, Ser. No. 721,943

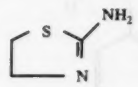
Int. Cl.² A61K *31/425, 31/415;* C07D *277/40, 231/34*

U.S. Cl. 424—270 **24 Claims**

1. A pharmaceutical composition having anti-inflammatory activity in humans as well as in other animals, said composition comprising a therapeutic compound having the formula:

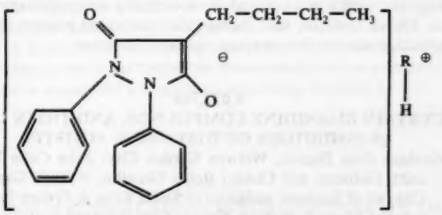


in which R is 2-amino-2-thiazoline having the formula:

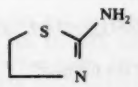


together with a non-toxic pharmaceutically acceptable carrier or diluent therefor, said therapeutic compound present in sufficient amount to exhibit said activity.

7. A pharmaceutical composition having analgesic activity in humans as well as in other animals, said composition comprising a therapeutic compound having the formula:

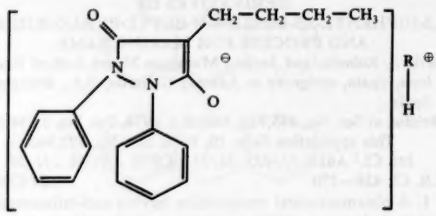


in which R is 2-amino-2-thiazoline having the formula:

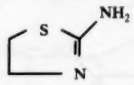


together with a non-toxic pharmaceutically acceptable carrier or diluent therefor, said therapeutic compound present in sufficient amount to exhibit said activity.

13. A pharmaceutical composition having anti-pyretic activity in humans as well as in other animals, said composition comprising a therapeutic compound having the formula:

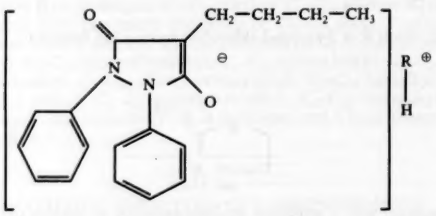


in which R is 2-amino-2-thiazoline having the formula:

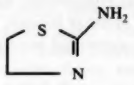


together with a non-toxic pharmaceutically acceptable carrier or diluent therefor, said therapeutic compound present in sufficient amount to exhibit said activity.

19. A pharmaceutical composition for treating rheumatic diseases in humans as well as in other animals, said composition comprising a therapeutic compound having the formula:



in which R is 2-amino-2-thiazoline having the formula:



together with a non-toxic pharmaceutically acceptable carrier or diluent therefor, said therapeutic compound present in an effective amount for carrying out said treatment.

4,072,748

CERTAIN GUANIDINE COMPOUNDS, AND THEIR USE AS INHIBITORS OF HISTAMINE ACTIVITY

Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

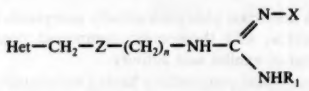
Division of Ser. No. 560,909, March 21, 1975, Pat. No. 4,000,296, which is a division of Ser. No. 384,992, Aug. 2, 1973, abandoned. This application Sept. 24, 1976, Ser. No. 726,331

Claims priority, application United Kingdom, Sept. 5, 1972, 41161/72

Int. Cl.[2] **C07D** *263/32, 275/02, 285/12;* **A61K** *31/425*

U.S. Cl. 424—270 **8 Claims**

1. A compound of the formula:



wherein R_1 is hydrogen or lower alkyl; Het is thiazol-2-yl, isothiazol-3-yl or 5-amino-1,3,4-thiadiazol-2-yl, Z is sulphur, oxygen, NH or a methylene group; *n* is 2 or 3; X is COR_3, CSR_3, SO_2R_4 or when Z is methylene, nitro; R_3 is lower alkyl, lower alkoxy, or amino; R_4 is lower alkyl, trifluoromethyl, amino or phenyl optionally substituted by halogen, lower alkyl or amino; or a pharmaceutically acceptable acid addition salt thereof.

7. A pharmaceutical composition to inhibit H-2 histamine receptors comprising, in an effective amount to inhibit said receptors, a compound according to claim **1** and a non-toxic pharmaceutically acceptable diluent or carrier.

8. A method of inhibiting H-2 histamine receptors which comprises administering to an animal in need thereof, in an effective amount to inhibit said receptors, a compound of claim **1**.

4,072,749

USE OF IPRONIDAZOLE IN COMBATTING CLOSTRIDIAL INFECTIONS

Gian Paolo Maestrone, Staten Island, N.Y., and Milan Mitrovic, Nutley, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed June 1, 1976, Ser. No. 691,793

Int. Cl.[2] **A61K** *31/415*

U.S. Cl. 424—273 R **8 Claims**

1. A method for the treatment of clostridial infections in ruminants which comprises orally administering to animals afflicted therewith feed or drinking water containing from about 0.005% by weight to about 0.03% by weight of a substance selected from the group consisting of ipronidazole and pharmaceutically acceptable acid addition salts thereof.

4,072,750

1,3,5-TRITHIANE AND 1,3,5-OXADITHIANE CARBAMOYLOXIME COMPOUNDS AND INSECTICIDAL AND MITICIDAL COMPOSITIONS AND METHODS EMPLOYING THEM

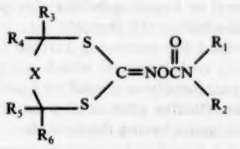
Themistocles D. J. D'Silva, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed June 1, 1976, Ser. No. 691,396

Int. Cl.[2] **C07D** *341/00, 327/00;* **A61K** *31/39, 31/385*

U.S. Cl. 424—276 **44 Claims**

1. A compound of the formula:



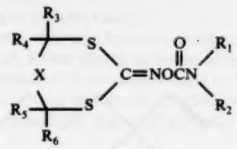
wherein:

R_1 and R_2 are individually hydrogen, alkyl, cycloalkyl or substituted alkyl or cycloalkyl wherein the permissible substituents are one or more fluoro, chloro, bromo, cyano, nitro or alkoxy substituents;

R_3, R_4, R_5 and R_6 are individually hydrogen or alkyl;

X is oxygen, sulfur, sulfinyl or sulfonyl; with the proviso that R_1, R_2, R_3, R_4, R_5 and R_6 substituents may not individually include more than 6 carbons.

16. An insecticidal and miticidal composition comprising an acceptable carrier and an insecticidally or miticidally effective amount of a compound of the formula:



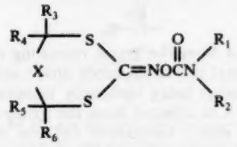
wherein:

R_1 and R_2 are individually hydrogen, alkyl, cycloalkyl or substituted alkyl or cycloalkyl wherein the permissible substitutents are one or more chloro, fluoro, bromo, nitro, cyano or alkoxy substitutents;

R_3, R_4, R_5 and R_6 are individually hydrogen or alkyl;

X is oxygen, sulfur, sulfinyl or sulfonyl; with the proviso that R_1, R_2, R_3, R_4, R_5 and R_6 substituents may not individually include more than six carbons.

30. A method of controlling insects and mites which comprises subjecting them to an insecticidally or miticidally effective amount of a compound of the formula:



wherein:

R_1 and R_2 are individually hydrogen, alkyl, cycloalkyl or substituted alkyl or cycloalkyl wherein the permissible substituents are one or more chloro, bromo, fluoro, cyano, nitro or alkoxy substituents;

R_3, R_4, R_5 and R_6 are individually hydrogen or alkyl;

X is oxygen, sulfur, sulfinyl or sulfonyl;

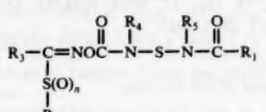
with the proviso that R_1, R_2, R_3, R_4, R_5 and R_6 substituents may not individually include more than six carbons.

4,072,751
PESTICIDAL N-SUBSTITUTED BIS-CARBAMOYL SULFIDE COMPOUNDS

Themistocles Damasceno Joaquim D'Silva, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Sept. 29, 1976, Ser. No. 727,987
Int. Cl.[2] **A01N** *9/00;* **C07C** *119/18*
U.S. Cl. 424—298 **21 Claims**

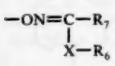
1. A compound of the formula:



wherein:

n is 1 or 2;

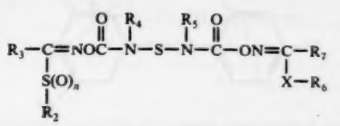
R_1 is fluorine or



X is sulfur, sulfinyl or sulfonyl;

R_2, R_3, R_4, R_5, R_6 and R_7 are individually alkyl having from 1 to 8 carbon atoms.

10. An insecticidally, nematocidally and miticidally active composition comprising an acceptable carrier and an insecticidally, nematocidally or miticidally effective amount of a compound of the formula:



wherein:

n is 1 or 2;

X is sulfur, sulfinyl or sulfonyl;

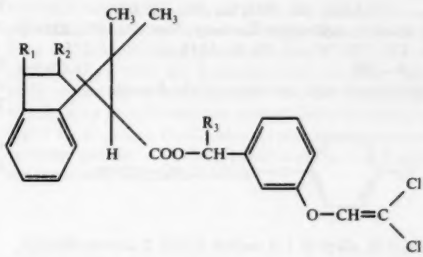
R_2, R_3, Rhd **4**, R_5, R_6 and R_7 are individually alkyl having from 1 to 8 carbon atoms.

4,072,752
PESTICIDAL BENZASPIRO CARBOXYLATES

Saleem Farooq, Aesch; Jozef Drabek, Allschwil; Laurenz Gsell, Fullinsdorf; Friedrich Karrer, Zofingen, and Willy Meyer, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sept. 17, 1976, Ser. No. 724,141
Claims priority, application Switzerland, Sept. 26, 1975, 12566/75; July 29, 1976, 9736/76; Apr. 29, 1976, 5388/76
Int. Cl.[2] **A01N** *9/20, 9/24;* **C07C** *121/66, 69/76*
U.S. Cl. 424—304 **6 Claims**

1. A compound of the formula



wherein each of R_1 and R_2 represents a hydrogen atom or together represent a carbon to carbon bond, and R_3 represents a hydrogen atom or a cyano group.

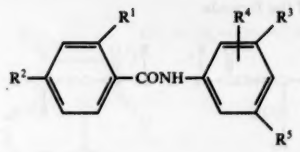
6. A method for combatting insects and acarids comprising applying to the locus thereof an insecticidally and acaricidally effective amount of a compound according to claim **1**.

4,072,753
PHARMACEUTICAL METHOD FOR THE THERAPY OF IMMUNE DISEASES

Hamao Umezawa; Tomio Takeuchi, both of Tokyo; Akira Takamatsu, Yokohama, and Shunro Mori, Fujisawa, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Japan

Division of Ser. No. 660,731, Feb. 24, 1976, Pat. No. 4,032,635. This application Feb. 17, 1977, Ser. No. 769,481
Claims priority, application Japan, June 12, 1975, 50-71629
Int. Cl.[2] **A61K** *31/235, 31/24, 31/245*
U.S. Cl. 424—308 **12 Claims**

1. The method for chemotherapeutically treating immune diseases and disorders which comprises administering to a living animal a pharmaceutical composition to suppress the immune response comprising an effective amount of a suppressing compound of the formula



wherein

R^1 is —O—CO—Y with Y being a lower alkyl or phenyl group;

R^2 is hydrogen, chlorine, fluorine, trifluoromethyl or lower alkyl;

R^3 and R^5 are hydrogen, fluorine, bromine, chlorine, nitro, or lower alkyl; and

R^4 is substituted at either the 2′ or 4′ position and is —O—CO—Y, Y meaning the same as noted above and lower alkyl as used herein is a straight or branched chain saturated hydrocarbon with 1 to 4 carbon atoms in combination with a pharmaceutically acceptable nontoxic carrier.

4,072,754

HYDRATROPIC ACID DERIVATIVES AND PROCESS FOR THE PRODUCTION THEREOF

Erich Schacht; Werner Mehrhof; Zdenek Simane; Herbert Nowak, and Detlev Kayser, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

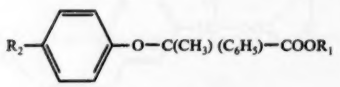
Filed Nov. 25, 1974, Ser. No. 527,089

Claims priority, application Germany, Nov. 26, 1973, 235878

Int. Cl.[2] C07C *65/14, 69/76;* **A61K** *31/19, 31/235*

U.S. Cl. 424—308 **15 Claims**

1. A hydratropic acid derivative of the formula



wherein R_1 is H, alkyl of 1–4 carbon atoms, 2-acetamidoethyl, or 2,3-dihydroxypropyl, and R_2 is Hal, phenyl, 4-Hal-phenyl, 4-Hal-phenoxy, 4-Hal-phenoxymethyl, 1,2,3,4-tetrahydro-1-naphthyl, Hal being F, Cl, or Br, or a physiologically acceptable salt thereof with an acid or base.

14. A method of lowering from an abnormally high level at least one of cholesterol and triglyceride serum levels which comprises administering systemically to a patient with such abnormally high level an amount of a compound of claim 1 effective to lower substantially said level.

15. A pharmaceutical composition effective for lowering from an abnormally high level at least one of cholesterol and triglyceride serum levels comprising an amount of a compound of claim 1 per unit dosage effective to lower an abnormally high cholesterol or triglyceride serum level, in admixture with a pharmaceutically acceptable carrier.

4,072,755

NOVEL CYCLOPENTANOIC ACID DERIVATIVES

Jean Buendia, Nogent sur Marne; Michel Vivat, Lagny-sur-Marne, and Jeanine Schalbar, Suresnes, all of France, assignors to Roussel UCLAF, Paris, France

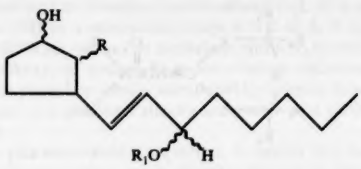
Filed Aug. 24, 1976, Ser. No. 717,049

Claims priority, application France, Aug. 29, 1975, 75 26617

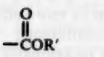
Int. Cl.[2] A01N *9/24;* **C09F** *5/00*

U.S. Cl. 424—312 **15 Claims**

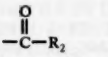
1. A compound of the formula



wherein R is



R′ is selected from the group consisting of hydrogen, alkyl of 1 to 4 carbon atoms and a non-toxic, pharmaceutically acceptable cation and R_1 is selected from the group consisting of branched or straight chain, saturated or unsaturated alkyl of 1 to 4 carbon atoms and



and R_2 is selected from the group consisting of straight or branched chain alkyl of 1 to 12 carbon atoms and phenyl with the alkyl and phenyl being optionally substituted with —COOA wherein A is selected from the group consisting of hydrogen, alkali metal, ammonium ion, ion of an organic amine, alkyl and haloalkyl of 1 to 7 alkyl carbon atoms and the OH and R groups on the ring and OR_1 group on the chain may be in either of the two possible positions about the carbon atom to which they are attached.

9. A method of relieving pain and inflammation in warm-blooded animals comprising administering to warm-blooded animals an effective amount of at least one compound of claim 1.

11. The method of claim 9 wherein the compound is ethyl (1RS, 2RS, 5RS, 3′SR) (1′E) 2-hydroxy-5-(3′-decanoyloxy-1′-octenyl)-cyclopentanecarboxylate.

4,072,756

TRICYCLO PIPERIDINO KETONES AND SOPORIFIC COMPOSITIONS THEREOF

Anton Ebnöther, Arlesheim; Jean-Michel Bastian, Therwil; Fulvio Gadient, and André Stoll, both of Birsfelden, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

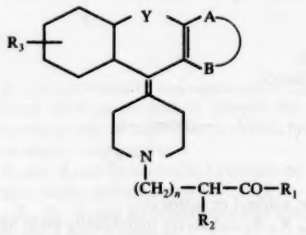
Continuation-in-part of Ser. No. 468,374, May 9, 1974, abandoned. This application May 13, 1976, Ser. No. 686,132

Claims priority, application Switzerland, May 17, 1973, 7048/73; May 17, 1973, 7051/73; May 17, 1973, 7053/73; May 17, 1973, 7054/73; May 17, 1973, 7055/73; May 17, 1973, 7056/73; May 17, 1973, 7057/73

Int. Cl.[2] C07D *495/04, 493/00, 495/00*

U.S. Cl. 424—267 **29 Claims**

1. A compound of the formula,



wherein

n is 1, 2 or 3,

R_1 is lower alkyl,
R_2 is hydrogen or lower alkyl,
R_3 is hydrogen, chlorine, bromine, fluorine, trifluoromethyl, lower alkyl, lower alkoxy or lower alkylthio,
A and B together with the double bond form a benzene ring, or a benzene ring substituted by chlorine, bromine, fluorine, trifluoromethyl, lower alkyl, lower alkoxy or lower alkylthio, or
A is sulphur and
A and B together with the double bond form a thiophene ring, or a thiophene ring substituted in the α position to the sulphur by chlorine, bromine or lower alkyl, and
Y is ethylene or vinylene, when A and B together with the double bond form a benzene ring, or a benzene ring substituted by chlorine, bromine, fluorine, trifluoromethyl, lower alkyl, lower alkoxy or lower alkylthio, or when A is sulphur and A and B together with the double bond form a thiophene ring, or a thiophene ring substituted in the α position to the sulphur by chlorine, bromine or lower alkyl, or
Y is oxygen, methyleneoxy, methylenethio or a group

wherein R_4 and R_5 are independently lower alkyl, when A and B together with the double bond form a benzene ring, or a benzene ring substituted by chlorine, bromine, fluorine, trifluoromethyl, lower alkyl, lower alkoxy or lower alkylthio, or
Y is sulphur, when A is sulphur and A and B together with the double bond form a thiophene ring,
or a pharmaceutically acceptable acid addition salt thereof.

3. A method of promoting sleep in animals which comprises administering to an animal in need of such treatment a therapeutically effective amount of a compound of claim 1.

4,072,757

N^2ALKOXYNAPHTHYLSULFONYL-L-ARGININAMIDES AND THE PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Shosuke Okamoto, 15-1i, Asahigaoka 3-chome, Tarumi, Kobe, Hyogo, Japan; Akiko Hijikata, Kobe, Japan; Ryoji Kikumoto, Machida, Japan; Yoshikuni Tamao, Yokohama, Japan; Kazuo Ohkubo, Machida, Japan; Tohru Tezuka, Yokohama, Japan, and Shinji Tonomura, Tokyo, Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo and Shosuke Okamoto, both of, Japan

Continuation-in-part of Ser. No. 653,217, Jan. 28, 1976, which is a continuation-in-part of Ser. No. 671,436, March 29, 1976, which is a continuation-in-part of Ser. No. 622,390, Oct. 14, 1975, abandoned. This application Jan. 19, 1977, Ser. No. 760,587

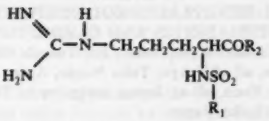
Claims priority, application Japan, Nov. 8, 1974, 49-128774; Nov. 8, 1974, 49-128775; Nov. 29, 1974, 49-136695; Nov. 29, 1974, 49-136697; Feb. 25, 1975, 50-023268; Feb. 26, 1975, 50-023635; Mar. 5, 1975, 50-026768; Mar. 11, 1975, 50-029357; Mar. 11, 1975, 50-029358

The portion of the term of this patent subsequent to Feb. 1, 1994, has been disclaimed.

Int. Cl.[2] **A61K** *31/445;* **C07D** *211/60*

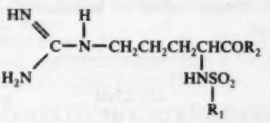
U.S. Cl. 424—267 **4 Claims**

1. N^2-alkoxynaphthylsulfonyl-L-argininamides having the formula:



and the pharmaceutically acceptable salts thereof, wherein R_1 is naphthyl substituted with at least one C_1–C_5 alkoxy; R_2 is piperidino substituted with —$COOR_3$wherein R_3 is selected from the group consisting of hydrogen, C_1–C_{10} alkyl, C_6–C_{10} aryl, C_7–C_{12} aralkyl and 5-indanyl, said substituted piperidino being optionally substituted with one or more substituents which, alike or different, are selected from the group consisting of C_1–C_{10} alkyl, C_1–C_{10} alkoxy, phenyl, alkoxycarbonyl or carboxy; and the —$COOR_3$ radical is at the 2 or 3-position of the piperidine radical.

4. A method for inhibiting activity and suppressing activation of thrombin in vivo, which comprises introducing into a mammal a pharmaceutically effective amount of an N^2-alkoxynaphthylsulfonyl-L-argininamide having the formula:



or the pharmaceutically acceptable salt thereof, wherein R_1 is naphthyl substituted with at least one C_1–C_5 alkoxy; R_2 is piperidino substituted with —$COOR_3$ wherein R_3 is selected from the group consisting of hydrogen, C_1–C_{10} alkyl, C_6–C_{10} aryl, C_7–C_{12} aralkyl and 5-indanyl, said substituted piperidino being optionally substituted with one or more substituents, which, alike or different, are selected from the group consisting of C_1–C_{10} alkyl, C_1–C_{10} alkoxy, phenyl, alkoxycarbonyl or carboxy; and the —$COOR_3$ radical is at the 2 or 3-position of the piperidino radical.

4,072,758

COMPOSITIONS AND METHODS FOR EFFECTING GLUCOREDUCTION

Antonio Carmelo Marin Moga, Barcelona, Spain, assignor to J. Uriach y Cia, S.A., Spain

Division of Ser. No. 466,412, May 2, 1974, Pat. No. 3,957,866, which is a continuation of Ser. No. 182,187, Sept. 20, 1971, abandoned. This application Feb. 6, 1976, Ser. No. 656,070

Claims priority, application Spain, Sept. 23, 1970, 384463

Int. Cl.[2] **A61K** *31/18*

U.S. Cl. 424—321 **4 Claims**

1. Method of effecting glucoreduction in a patient requiring the same, which comprises administering to such patient a glucoreduction effective amount of N-[4-beta-(o-anisamide-ethyl)-benzenesulphonyl]-N′-cyclopentylcarbamide or a pharmaceutically acceptable salt thereof.

3. Composition for achieving glucoreduction, comprising a pharmaceutical carrier and a glucoreduction effective amount of N-[4-beta-(o-anisamide-ethyl)-benzenesulphonyl]-N′-cyclopentylcarbamide or a pharmaceutically acceptable salt thereof.

4,072,759

NOVEL BENZYLALCOHOL DERIVATIVES AS ANTIDIABETICS AND CARDIOTONICS

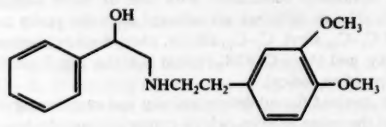
Muneyoshi Ikezaki, Ageo; Nobuo Ito; Yasushi Okazaki; Masao Hoshiyama, all of Tokyo; Taku Nagao, Ageo, and Hiromichi Nakajima, Yono, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Division of Ser. No. 618,355, Oct. 1, 1975, Pat. No. 4,032,575. This application Nov. 10, 1976, Ser. No. 740,399

Int. Cl.[2] A61K *31/135*

U.S. Cl. 424—330 9 Claims

1. A pharmaceutical composition consisting essentially of an amount of a compound having the following formula:



wherein Ring A is 4-hydroxyphenyl or a pharmaceutically acceptable acid addition salt thereof which is necessary to produce a cardiotonic effect by administration to a warm-blooded animal.

4,072,760

BRONCHOSPASMOLYTIC PHENYLETHANOLAMINES

Kurt Hedegaard, Horsholm, Denmark, assignor to Pharmacia AS, Hillerod, Denmark

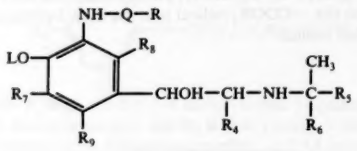
Filed Nov. 17, 1975, Ser. No. 632,211

Claims priority, application United Kingdom, Nov. 20, 1974, 50190/74

Int. Cl.[2] A61K *31/135*; C07C *91/22*

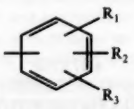
U.S. Cl. 424—330 10 Claims

1. A phenylethanolamine of the formula



I

wherein R is a substituted phenyl group of the formula



wherein R_1, R_2, and R_3 are the same or different and each represent hydrogen, hydroxy, halogen, trifluoromethyl, nitro, lower alkylcarbonyl, lower alkyl, lower alkoxy, hydroxy-lower alkyl, hydroxy-lower alkoxy, lower alkoxy-lower alkoxy, lower alkyl-carbonyl-lower alkoxy, or aryl-lower alkoxy, with the proviso that not all of R_1, R_2, and R_3 are hydrogen, R_4 is hydrogen or lower alkyl, R_5 is hydrogen, lower alkyl, or optionally substituted benzyl, and R_6 is hydrogen or lower alkyl, R_7 is hydrogen, halogen, or lower alkyl, R_8 is hydrogen or lower alkyl, R_9 is hydrogen or lower alkyl, Q is $—CH_2—$, and L is hydrogen and enantiomers and, when more than one asymmetric carbon atom is present, also diastereoisomers, and physiologically acceptable salts thereof.

9. A pharmaceutical composition comprising a bronchospasmolytically effective amount of a compound of the formula I as defined in claim 1 or a salt thereof together with a pharmaceutically acceptable carrier.

4,072,761

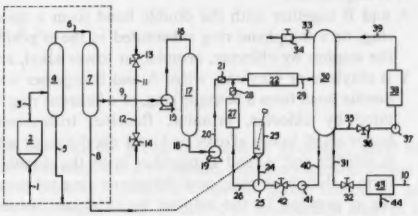
AROMATIZATION OF COFFEE PRODUCTS

Geoffrey Margolis, Marysville, and Richard Tien-Szu Liu, Worthington, both of Ohio, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed Nov. 24, 1975, Ser. No. 634,487

Int. Cl.[2] A23F *1/04*

U.S. Cl. 426—387 14 Claims



1. A process for aromatizing a coffee product comprising:
a. collecting an aroma gas comprising non-condensible volatiles of coffee;
b. admixing the aroma gas under a pressure of at least 5 kg/cm^2 with a quantity of an absorbent comprising aqueous liquid and liquid edible oil under such conditions as to produce an aroma-emulsion foam; and
c. contacting said aroma-emulsion foam with soluble coffee solids to incorporate aroma in said soluble coffee solids, said foam functioning to provide substantially more liquid surface area than an equal amount of unfoamed absorbent, thereby to absorb a greater volume of said aroma gas in said quantity, than would be absorbed in said amount under similar conditions.

4,072,762

PROCESSES OF COOLING FOODS AND APPARATUS THEREFOR

Ignace Rhodes, c/o Electro Dispersion Corp., 36-16 29th St., Long Island City, N.Y. 11106

Continuation of Ser. No. 806,008, March 3, 1969, abandoned, which is a continuation of Ser. No. 446,859, April 9, 1965, abandoned. This application Apr. 11, 1972, Ser. No. 243,025

Int. Cl.[2] A23L *1/01*

U.S. Cl. 426—510 8 Claims

1. In a process of cooking food, which process includes cooking the food in a chamber, supporting the food in the chamber on a grounded hearth while heating the food in a chamber from a high temperature source within the chamber external to the food and providing steam in the chamber: wherein the improvement comprises creating and maintaining a hot and highly humid atmosphere immediately surrounding the exposed surface of the food in the chamber at an early stage of cooking so as to speed up the cooking process while localizing the steam in the vicinity of said exposed surface of the food as it is being heated, creating and maintaining said aforesaid atmosphere and localizing the steam by suspending in the chamber above the hearth a grid of electrically conductive downwardly extending pins with lower pointed ends, said pins being electrically insulated from the hearth, and connecting a source of high potential DC to said grid sufficient to cause steam to move downwardly to the hearth and food thereon thereby establishing in the chamber, in conductive relationship

to the atmosphere above the said surface of the food exposed in the chamber, at an early stage of cooking, a direct current high potential electrostatic field between the grid and the food articles on the grounded hearth.

4,072,763

MEAT PRODUCT AND METHOD OF MAKING SAME

Clyde Mart, 24900 Duffield Road, Beachwood, Ohio 44122

Filed Sept. 20, 1976, Ser. No. 724,567
Int. Cl.[2] A23J *3/00*
U.S. Cl. 426—513 6 Claims

1. A meat product consisting of a flat or planar cut of predetermined thickness and peripheral contour, consisting of thin slices of meat, arranged in a layered structure, in which the layers of the meat extend substantially perpendicular to the flat plane of the cut, and are disposed substantially concentrically about the center or axis of the cut, with the grain of the slices of meat extending along lines substantially perpendicularly to the center or axis of the cut.

4,072,764

EGG YOLK EXTENDER

William B. Chess, Monsey, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Apr. 15, 1976, Ser. No. 677,354
Int. Cl.[2] A21D *13/08;* A23L *1/32*
U.S. Cl. 426—558 45 Claims

1. An egg yolk extender comprising full fat soy flour, a grain flour, lecithin, said grain flour being present in a ratio to said full fat soy flour within the range of from about 1:10 to about 1:1 and said lecithin being present in a ratio to said full fat soy flour within the range of from about 1:100 to about 20:100, all ratios being on a weight basis and from about 1 to about 12 parts of a food grade emulsifier other than lecithin and from about 1 to about 12 parts of a humectant, said parts being by weight per 100 parts of full fat soy flour.

4,072,765

METHOD OF MAKING AN EXTRACTABLE COFFEE SUBSTITUTE

Edward Louis Scarsella, Bedford Hills, N.Y., and Clifford Henry Spotholz, Montvale, N.J., assignors to General Foods Corporation, White Plains, N.Y.

Filed July 21, 1976, Ser. No. 707,738
Int. Cl.[2] A23F *1/16*
U.S. Cl. 426—596 2 Claims

1. A method of making an extractable beverage composition by combining on a weight basis:

a. 35 to 55% roasted and comminuted raw wheat,

b. 40 to 60% roasted and comminuted coffee, said coffee containing at least 60% high-grade, Arabica coffees and said coffee being roasted to a darker color and comminuted to a finer particle size than the roasted and comminuted wheat of a), and

c. 3 to 6% of an acid or enzymatically hydrolysed starch material having a D.E. of from 5 to 19.

4,072,766

COCOA BUTTER COMPOSITIONS

Francis E. Luddy, Hatboro; James W. Hampson; Samuel F. Herb, both of Philadelphia, and Herbert L. Rothbart, Flourtown, all of Pa., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 642,837, Dec. 22, 1975, Pat. No. 4,049,839, which is a division of Ser. No. 337,789, March 5, 1973, Pat. No. 3,944,585. This application Mar. 23, 1977, Ser. No. 780,567
Int. Cl.[2] A23D *5/00*
U.S. Cl. 426—607 2 Claims

1. A cocoa butter composition consisting essentially of a 50/50 mixture of cocoa butter and a plastic solid tallow fraction having a gas-liquid chromatographic profile indicating a trace %, 30%, 49% and 21% of glycerides having carbon numbers of 48, 50, 52 and 54, respectively, and a thermal profile indicating softening at about 20° C., commencement of rapid melting at about 30° C., and complete melting at about 37° C.

2. A cocoa butter composition consisting essentially of 40% of a plastic solid tallow fraction having a gas-liquid chromatographic profile indicating a trace %, 30%, 49% and 21% of glycerides having carbon numbers of 48, 50, 52 and 54, respectively, and a thermal profile indicating softening at about 20° C., commencement of rapid melting at about 30° C. and complete melting at about 37° C., 10% of a high melting crystalline tallow fraction having a gas-liquid chromatographic profile indicating a composition having 15%, 28%, 36% and 21% of glycerides having carbon numbers of 48, 50, 52 and 54, respectively, and a thermal profile indicating softening and commencement of melting at about 42° C. and complete melting at about 51° C., and 50% cocoa butter.

4,072,767

METHOD FOR CONTROLLING CHEMICAL VAPOR DEPOSITION

Kyo Suda, Hachioji; Katsumi Takami, Tokyo; Akira Shintani, and Shinobu Hase, both of Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan

Filed June 7, 1976, Ser. No. 693,312
Claims priority, application Japan, June 6, 1975, 50-67645
Int. Cl.[2] C23C *13/04;* C01B *33/12*
U.S. Cl. 427—8 25 Claims

1. In a process for chemical vapor deposition of particles of a film-forming substance on a substrate wherein the particles result from a reaction of gases of a gaseous mixture in a reactor, the improvement comprising measuring optically the particle size of particles of the film-forming substance formed in the reactor, converting the optically measured value to an electric signal, and controlling the flow rate of at least one gas of the gaseous mixture to be introduced into the reactor in response to the electric signal whereby a good quality film is produced.

4,072,768

METHOD FOR MAKING PATTERNED GOLD METALLIZATION

David Bruce Fraser, Berkeley Heights, and Guenther Wilhelm Kammlott, Watchung, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 23, 1976, Ser. No. 651,634
Int. Cl.[2] H05K *1/00*
U.S. Cl. 427—34 12 Claims

1. A method for making a gold pattern on a substrate, comprising the steps of (1) depositing on said substrate a layer consisting essentially of gold oxide, said layer having a thickness in the range of from 0.01 to 5.0 micrometers, (2) patterning said layer by selectively reducing portions of said layer to metallic gold by irradiation of said portions with electrons or light, and (3) exposing the entire layer to a chemical agent whereby the unreduced portions of said layer are removed.

4,072,769

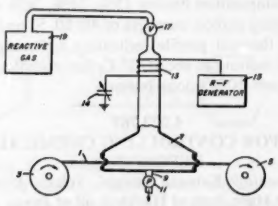
TREATING POLYMERIC SURFACES

Darrel D. Lidel, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 80,482, Oct. 13, 1970, Pat. No. 3,761,299, and a continuation-in-part of Ser. No. 772,745, Nov. 1, 1968, abandoned, and Ser. No. 452, Jan. 2, 1970, abandoned. This application Dec. 7, 1972, Ser. No. 313,029
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl. B05D *3/06*
U.S. Cl. 427/38 15 Claims

1. A process for changing the properties of a surface of a shaped organic polymeric material, said surface containing carbon to hydrogen bonds having a dissociation energy of less than about 100 K cal./mol, said process comprising exposing

said surface to a stream of a mixture of (1) a reactive gas selected from the group consisting of (a) N_2O_3, (b) water vapor and (c) a vapor of an organic compound which is an acid, an alcohol, an ester, an amine, a nitrile or a vinyl compound having a vinyl moiety activated by an adjacent electronegative group, said gas having a partial pressure of at least 0.001 mm. Hg. at a temperature in the range of about 10 to about 150°C., with (2) an activator gas selected from the group consisting of argon, helium, krypton, neon, nitrogen, radon, xenon and mixtures thereof, said stream of gases having been activated by treating with a radio frequency electromagnetic field ranging from about $\frac{1}{2}$ to about 30,000 megahertz and said field being remote from said support, said process being conducted at a



pressure of about 0.01 to about 20 mm Hg., said acid being an aliphatic or aromatic mono- or dicarboxylic acid having up to about 10 carbon atoms, said alcohol being aliphatic mono- or polyol or a phenol having up to about 10 carbon atoms, said ester being an ester being derived from said acid and an aliphatic monohydroxy alcohol having less than 6 carbon atoms, said amine being primary, secondary or tertiary aliphatic or aromatic amine having up to 20 carbon atoms, said nitrile being an aromatic or aliphatic cyano-substituted compound having up to about 10 carbon atoms, and said vinyl compound being a compound having a vinyl, vinylene or vinylidene group attached to a carbonyl, sulfonyl, cyano, formyl, carboxy, halogen or nitro group.

11. A polymeric article treated by the process of claim **1**.

4,072,770

U.V. CURABLE POLY(ESTER-URETHANE) POLYACRYLATE POLYMERS AND WET LOOK COATINGS THEREFROM

Vincent Wen-Hwa Ting, Brunswick, Ohio, assignor to SCM Corporation, New York, N.Y.

Filed May 11, 1976, Ser. No. 685,373
Int. Cl.² B05D *3/06*
U.S. Cl. 427—54 **15 Claims**

1. A poly(ester-urethane) polyacrylate polymer comprising the product obtained by reacting a polyurethane intermediate having 4 to 10 terminally-positioned reactive isocyanate groups with 4 to 10 molar equivalents of a hydroxy (lower) acrylate or methacrylate said intermediate resulting from the reaction of 1 to 7 moles of a polyester diol having a molecular weight in the range of 500 to 12,000; 2 to 8 moles of a monomer polyol having 3 to 12 carbon atoms and at least 3 reactive hydroxyl groups; and 6 to 24 moles of an organic diisocyanate.

9. A process for imparting a wet look coating to a substrate which comprises:

(a) forming a radiation curable composition comprising on a weight percent basis:
  (i) 30 to 70 percent of a polyurethane polymer of claim **1**;
  (ii) 10 to 40 percent of a monofunctional acrylate monomer;
  (iii) 5 to 50 percent of a multifunctional acrylate crosslinking agent; and
  (iv) 3 to 5 percent of a photosensitizer said composition totaling 100 percent;
(b) applying said mixture as a 0.1 to 10 mil thick coating to a substrate selected from the group consisting of flat stock metal, wood, fiberboard and floor tile; and
(c) curing said coating substrate in air at ambient temperature by passing the substrate at a rate of from 10 to 1000 foot/minute through an effective field of ultraviolet radiation.

4,072,771

COPPER THICK FILM CONDUCTOR

John D. Grier, Sr., Harleysville, Pa., assignor to Bala Electronics Corporation, Conshohocken, Pa.

Filed Nov. 28, 1975, Ser. No. 636,074
Int. Cl.² B05D *5/12;* **B32B** *17/06;* **H01B** *1/08*
U.S. Cl. 427—96 **14 Claims**

13. A method of making an electrical conductor element consisting essentially of the steps of

taking a powder of fine copper particles,
preoxidizing the copper to form an oxidized copper powder,
mixing the oxidized copper powder with a glass frit comprising about 1–10% by weight of the total solids in the solids mixture,
with the copper oxide being about 1–5% by weight of the total solids in the solids mixture,
mixing the solids mixture with a volatile and decomposable fluid suspending vehicle to form a copper thick film paste,
applying the paste onto an insulating substrate,
drying the paste on the substrate and evaporating the vehicle,
and firing said substrate in an inert, non-oxidizing, non-reducing atmosphere to adehere said copper thereto.

4,072,772

LINEAR CURTAIN SPRAY APPLICATOR

Helmut Franz, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Aug. 9, 1973, Ser. No. 387,056
Int. Cl.² B05D *1/02, 1/36, 5/06*
U.S. Cl. 427—164 **3 Claims**

1. In a method of coating a planar surface of an article wherein the surface is coated by displacing the article in a downstream direction along an article movement path lying in a generally horizontal plane with the surface to be coated facing upwardly; applying a liquid rinsing medium to the surface of the article to rinse the surface by directing the rinsing medium downwardly to the surface as a plurality of atomized, conical sprays substantially aligned with and spaced from one another across the article movement path; and applying a liquid coating medium to the rinsed surface of the article to coat the surface; the improvement which comprises:

directing adjacent sprays of said plurality of sprays of rinsing medium toward the surface of the article such that the adjacent portion of the outer periphery of each of the adjacent sprays at the surface of the article is at the centroid of the next adjacent spray and such that the spray closest each marginal edge of the article surface overlies that edge; while
adjusting and maintaining the sprays of rinsing medium to be of substantially equal force such that a peripheral portion

of each spray is substantially aligned with a like peripheral portion of each other spray along a common line extending across the article movement path; and wherein the interactions of the adjacent sprays of rinsing medium provide a substantially linear spray front of substantially uniform rinse medium thickness across the surface of the article prior to the application of the coating medium to it.

4,072,773

POROUS SHEET MATERIAL AND ITS PRODUCTION

Osamu Fukushima, Kurashiki, Japan, assignor to Kuraray Co., Ltd., Kurashiki, Japan

Division of Ser. No. 392,137, Aug. 27, 1973. This application Feb. 23, 1976, Ser. No. 660,098

Claims priority, application Japan, Aug. 30, 1972, 47-86988

Int. Cl.[2] B05D 5/00

U.S. Cl. 427—246 **8 Claims**

1. A process for producing a porous sheet material made of a polymeric material consisting essentially of a polyurethane elastomer, which comprises applying a polymer composition in solution consisting essentially of a polyurethane elastomer and a cellular structure regulating agent, in an amount of from 3 to 25% by weight based on the weight of the polymer composition, on a support material and treating the resulting sheet material in a first stage coagulation bath at 35° to 65° C to coagulate the surface of said sheet material and then in a second stage coagulation bath at a temperature not less than 5° C lower than the temperature of the said first stage coagulation bath to complete the coagulation to obtain the porous sheet material comprising a base layer of vertically penetrating vesicular structure and a surface layer of microporous structure integrally provided on one of the surfaces of the said base layer.

4,072,774

SEALING METHOD FOR POROUS MATERIAL

Fred R. Youngren, Lexington, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 18, 1975, Ser. No. 587,741

Int. Cl.[2] B05D 3/00, 3/02

U.S. Cl. 427—294 **3 Claims**

1. A process for impregnation of a fused silica porous object having pore radii of about 0.5 to about 1 micron with a sealant in an ambient atmosphere comprising:

cleaning contaminants from said object an drying thereof;

immersing said object to a depth of a portion of the shortest dimension thereof in a resin sealant; and

maintaining said atmosphere and said sealant at the temperature of minimum viscosity thereof for three to sixteen hours for substantially complete impregnation of the pores of said object by said sealant to provide a sealed object.

3. An impregnation process as in claim 1 with positive and negative pressures respectively applied to said sealanat and said object for reduction of the time required for said impregnation.

4,072,775

METHOD FOR APPLYING A FOAM BACKING TO FABRIC

Forrest T. James, Burlington, and Stephen L. Guy, Greensboro, both of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Division of Ser. No. 565,704, April 7, 1975, Pat. No. 4,016,831. This application Dec. 8, 1976, Ser. No. 748,400

Int. Cl.[2] B05D 7/00

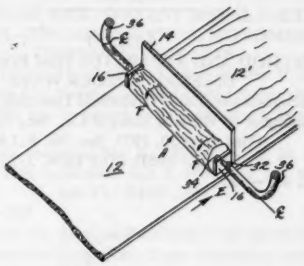
U.S. Cl. 427—373 **6 Claims**

1. A method of applying foam coating to a fabric to provide a backing therefor, comprising the steps of

a. defining a fluid-foam pillow of a predetermined volume on a web of fabric to be backed by confining the volume on the top, front, and two sides thereof, the fabric web supporting the pillow bottom,

b. passing fabric of said web past said foam pillow, said pillow generally rolling about a generally horizontal axis which is transverse with respect to said web as said fabric web is moved with respect thereto,

c. allowing only a portion of the foam in said pillow to pass with said web as it moves past the pillow, and



d. continuously replenishing the foam material in said pillow to substantially maintain said predetermined volume thereof by introducing a flow of foam into said pillow at least two spaced points in the interior of said pillow, said flow being introduced generally along said axis of said pillow, one of said points being on each side of said reservoir.

4,072,776

PROCESS FOR THE FLAMEPROOFING OF TEXTILE MATERIALS

Fritz Linke; Walter Dürsch, both of Konigstein, Taunus, and Hans-Jerg Kleiner, Kronberg, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

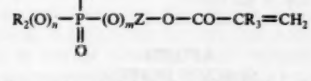
Filed Oct. 10, 1975, Ser. No. 621,502

Claims priority, application Germany, Oct. 19, 1974, 2449465

Int. Cl.[2] B05D 3/02

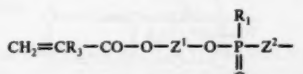
U.S. Cl. 427—390 D **6 Claims**

1. A process for the flameproofing of fiber material, which comprises applying (meth-)acrylic acid-alkyl-esters of the general formula



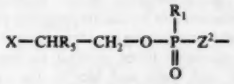
I,

in which n and m and 0 or 1 and $(n+m)$ are 0 or 1, and R_1 stands for a saturated or unsaturated aliphatic hydrocarbon radical having from 1 to 8, preferably from 1 to 4 carbon atoms, which radical may also be substituted, preferably monosubstituted, by chlorine, bromine, the nitrile group, or the radicals $—OR_4$ or $—COOR_4$, R_2 has the same meaning as R_1 and if n is 0 and m is 1 may also be a group of the formula



Ia

or



Ib,

Z, Z^1, Z^2 represent straight-chain or branched $(C_1–C_3)$-alkylene radicals which may also be substituted, preferably mono-

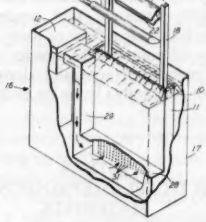
substituted, by chlorine, bromine or the hydroxy group, X stands for a hydrogen, a chlorine or a bromine atom, a hydroxy or a methyl group, R_3 represents a hydrogen atom or a methyl group, and R_4 is a hydrogen atom or an alkyl group having from 1 to 8 carbon atoms, and R_5 is a hydrogen atom, the methyl or the chloromethyl group, onto the fiber material, the said (meth-)acrylic acid-alkyl-esters being dissolved in an inert solvent, and subjecting the latter substances to a polymerization by using radicals.

4,072,777

METHOD AND APPARATUS FOR FORMING A UNIFORM SOLDER WAVE

David Schoenthaler, Lower Makefield Township, Bucks County, Pa., assignor to Western Electric Co., Inc., New York, N.Y.

Filed June 30, 1977, Ser. No. 811,935
Int. Cl.[2] B05D *1/18;* B05C *3/10*
U.S. Cl. 427—433 **5 Claims**



1. A soldering apparatus arranged to form a uniform overflowing molten solder wave comprising a vessel having a rectangular cross section and which is open at the top, the apparatus further comprising:

means for channeling the molten solder along the outside surface of the vessel; and

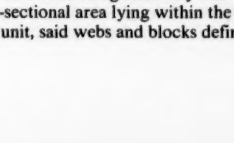
said vessel having an opening therein which decreases in size in the direction of the solder flow to cause the molten solder to flow from the channeling means into the vessel at a constant mass flow rate along the length of said channeling means resulting in a uniform overflow wave of solder from the top of the vessel.

4,072,778

SPACING SYSTEM

Robert Colin Lamb, 8 Lilac Lane, Maungaraki, Lower Hutt, New Zealand

Continuation-in-part of Ser. No. 624,834, Oct. 22, 1975, abandoned. This application July 23, 1976, Ser. No. 708,006
Int. Cl.[2] B32B *7/08*
U.S. Cl. 428—52 **7 Claims**



1. A spacer unit for preventing extrusion of sealants comprising a plurality of incompressible blocks skeletally interconnected in spaced relationship by incompressible web members, said blocks and webs comprising an arrangement and material resistant to a compressive force normal to the direction of interconnection of said webs and blocks, the cross-sectional area of said blocks and webs being relatively small with respect to the entire cross-sectional area lying within the outer periphery of said spacer unit, said webs and blocks defining openings therebetween for receiving a sealant for preventing extrusion thereof when the spacer unit is subjected to a compressive force normal to the direction of interconnection of said webs and blocks.

4,072,779

POLYETHYLENE TEREPHTHALATE FILM

Kenneth Leith Knox, Circleville, Ohio, and Joseph Kolb Lees, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 284,131, Aug. 28, 1972, abandoned. This application June 30, 1975, Ser. No. 592,075
Int. Cl.[2] C08G *63/70, 63/18*
U.S. Cl. 428—220 **2 Claims**

1. An article of manufacture suitable for use in optically transparent glass laminar structures comprising a frangible, dimensionally stabilized and optically transparent film structure of crystalline polyethylene terephthalate which is asymmetrically oriented by stretching 1.0 to 1.25 times in one direction in the plane of the film and about from 3 to 4 times in a second direction in the plane of the film, the film having a pneumatic impact strength of less than 10 kg.-cm., a tensile strength at break of less than 12,000 psi in at least one direction of said film and an elongation at break of less than 50% in the same film direction, a shrinkage of less than 5% in any direction at 135° C., an optical retardation of about from 5,000 to 7,000 millimicrons, a thickness of at least 1 mil and a gauge deviation of less than 1% per inch along the surface of said film, wherein said film structure is substantially free of color fringes upon viewing in partially polarized light.

4,072,780

PROCESS FOR MAKING ELECTRICAL COMPONENTS HAVING DIELECTRIC LAYERS COMPRISING PARTICLES OF A LEAD OXIDE-GERMANIUM DIOXIDE-SILICON DIOXIDE GLASS AND A RESIN BINDER THEREFORE

Jack H. Zillman, San Juan Capistrano, Calif., assignor to Varadyne Industries, Inc., Santa Monica, Calif.

Filed Oct. 28, 1976, Ser. No. 736,486
Int. Cl.[2] B32B *5/16, 31/04, 31/18*
U.S. Cl. 428—325 **4 Claims**

1. An electrical component comprising a stack of flat planar dielectric wafers, each of said wafers having an electrically conductive layer thereon, said wafers being composed of minute particles of glass formed of silicon dioxide, lead oxide and germanium dioxide, in substantially the following proportions by weight: lead oxide (82%), germanium dioxide (11%) and silicon dioxide (7%), and an organic polymeric binder for said particles, and said conductive layer being formed of silver.

2. A process for making an electrical component in the form of a stack of flat planar dielectric wafers, each of said wafers having an electrically conductive layer thereon, said process including the following steps: intermixing lead oxide and germanium dioxide and silicon dioxide in powdered form and in substantially the following proportions by weight: lead oxide (82%), germanium dioxide (11%) and silicon dioxide (7%) and forming minute glass particles from the resulting composition, intermixing the glass particles with an organic polymeric binder, casting the resultant composition into a tape, cutting the tape to form the dielectric wafers, and forming a pattern of silver on each of the dielectric wafers to constitute the electrically conductive layer.

4,072,781

MAGNETIC RECORDING MEDIUM

Ryuji Shirahata; Masaaki Suzuki, and Tatsuji Kitamoto, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Nov. 3, 1975, Ser. No. 628,431
Claims priority, application Japan, Nov. 1, 1974, 49-126364
Int. Cl.[2] B05D *5/12*
U.S. Cl. 428—336 7 Claims

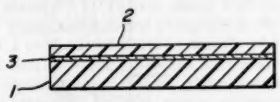
1. A magnetic recording medium comprising a nonmangetizable base having provided thereon a magnetizable layer formed by electroless plating, said magnetizable layer containing a ferromagnetic metal selected from the group consisting of Co, Co-Ni, Co-Fe and Co-Ni-Fe in amounts of greater than 50 wt. % Co, 0 to 50 wt. % Ni, 0 to 30 wt. % Fe based on the total weight of said manetizable layer; said magnetizable layer further containing phosphorus in an amount of 0.5 to 10 wt. % based on the total weight of the magnetizable layer and at least one member selected from the group consisting of copper, lead and silicone in an amount of 0.05 to 1.0 wt. % based on the total weight of said magnetizable layer.

4,072,782

COMPOSITE EROSION RESISTANT OPTICAL WINDOW

William E. Kramer, Plum Borough; Richard H. Hopkins, Monroeville, and Richard A. Hoffman, Franklin, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 7, 1976, Ser. No. 647,025
Int. Cl.[2] B29D *11/00;* G02B *1/00;* B32B *17/06*
U.S. Cl. 428—409 8 Claims



1. An optical window comprising a substrate of material having high transparency over a desired spectral range of infrared radiation, a protective layer of a material of high resistance to rain erosion, said protective layer being thin as compared to the substrate and of such thickness that it does not materially affect the optical properties of the window, and a layer of non-crystalline bonding material joining said protective layer to said substrate, said bonding material being a glass which is transparent in said spectral range, and which has a refractive index close to the refractive index of at least one of the protective layer and the substrate, and a softening temperature below the melting points of the protective layer and the substrate.

4,072,783

METHOD FOR SURFACE TREATMENT OF STEEL SHEET AND STEEL SHEETS OBTAINED THEREFROM

Motoi Yasue; Yoshikazu Tagawa, and Mitsuo Higashi, all of Uenomachi, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation of Ser. No. 378,412, July 12, 1973, abandoned, which is a continuation-in-part of Ser. No. 170,290, Aug. 9, 1971, abandoned, which is a continuation-in-part of Ser. No. 783,766, Dec. 13, 1968, abandoned. This application May 12, 1975, Ser. No. 576,432
Claims priority, application Japan, Dec. 23, 1967, 42-82562; Dec. 23, 1967, 42-8263; Dec. 23, 1967, 42-8264; Nov. 29, 1968, 43-85019
Int. Cl.[2] B05D *5/04, 7/14;* B32B *15/18*
U.S. Cl. 428—341 19 Claims

1. Method for surface treatment of steel sheet which comprises coating the steel sheet with 5 - 200mg/m^2 of a treating solution consisting essentially of at least one member of the group consisting of linseed oil, cottonseed oil and dioctyl sebacate and a mineral oil, the mineral oil constituting about 0.5 - 15% by volume of the solution whereby said sheet can be directly painted or printed without a prior degreasing.

2. Method for surface treatment of steel sheet which comprises coating the steel sheet with 5 - 200mg/m^2 of a treating solution consisting essentially of dioctyl sebacate, glycol mono-oleate and glycol di-oleate, wherein the glycol portion is a mono or polyvalent alcohol having from 3 to 20 carbon atoms, and a mineral oil, the mineral oil constituting about 0.5 - 15% by volume of the solution whereby said sheet can be directly painted or printed without a prior degreasing.

4,072,784

FIXATION OF MULTIVALENT METAL SALTS OF CARBOXYL-CONTAINING VINYL MONOMERS ON FIBROUS SUBSTRATES

Vidabelle O. Cirino, Hereford, Tex., and Stanley P. Rowland, New Orleans, La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Continuation-in-part of Ser. No. 501,421, Aug. 28, 1974, abandoned. This application Apr. 9, 1976, Ser. No. 675,103
Int. Cl.[2] B44D *1/44*
U.S. Cl. 428—507 7 Claims

1. A process for preparing cellulosic or synthetic fibers having anti-bacterial properties, flame retardancy and sanitizing characteristics comprising:

(a) immersing a cellulosic or synthetic fiber in an aqueous solution containing about 1–40 weight percent of a water soluble polyvalent metal salt of a carboxyl containing acrylic or vinyl monomer, about 0-3 weight percent of a water soluble polyfunctional vinyl monomer, about 0–15 weight percent of a monofunctional vinyl comomomer and about 0.03 to 3.0 weight percent of a free radical initiator;

(b) squeezing the immersed fiber from step (a) to remove the excess solution;

(c) curing the squeezed fiber from step (b) at a temperature of 120°–160° C.;

(d) washing the cured fiber from step (c); and

(e) drying the washed fiber from (d).

4,072,785

DIMENSIONALLY STABLE, NITROCELLULOSE COATED CELLOPHANE

John S. Taylor, Newark, and William G. Grantham, Wilmington, both of Del., assignors to FMC Corporation, Philadelphia, Pa.

Filed July 5, 1974, Ser. No. 486,025
Int. Cl.[2] B44D *1/092*
U.S. Cl. 428—536 12 Claims

1. A process which includes the steps of passing a purified gel regenerated cellulose film through an aqueous solution containing, as a plasticizer for such film, polyethylene glycol having an average molecular weight between 285 and 4,000 and a water-soluble cellulose ether having a concentration not less than about 0.3% by weight in the aqueous solution and selected from the group consisting of methyl cellulose and hydroxyalkyl methyl cellulose and mixtures thereof, and thereafter drying the plasticized gel regenerated cellulose film, the water-soluble cellulose ether in the aqueous solution being sufficient to provide the dried film with an amount thereof which is effective to at least minimize the migration of the plasticizer.

4,072,786

PRODUCTION OF FLOOR TOPPINGS BY FLOWING INORGANIC BINDER SUSPENSIONS OVER POROUS OPEN-CELL UNDERLAYS

Friedrich Hinsche, Leverkusen, and Kurt Schaupp, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 29, 1975, Ser. No. 608,953
Claims priority, application Germany, Sept. 3, 1974, 2442183
The portion of the term of this patent subsequent to Feb. 1, 1994, has been disclaimed.
Int. Cl.[2] E04B *5/00*
U.S. Cl. 428—537 7 Claims

1. In the production of a floor topping by the flow method,

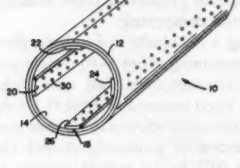
comprising providing a water-absorbing layer on a floor to be topped, pouring a free-flowing mass comprising water and at least one of gypsum and anhydrite onto said water-absorbing layer whereby said mass forms a level floor topping, and allowing said mass to harden, the improvement which comprises emplying as said water-absorbing layer a strong porous open-cell foamed material.

4,072,787

LAMINATED WALL TUBING

Earl C. Ricks, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 3, 1977, Ser. No. 756,319
Int. Cl.[2] B23K *11/10, 31/06;* B32B *1/08;* F16L *39/00*
U.S. Cl. 428—594 2 Claims



1. A laminated tubular structure comprising:
a. first and second sheet members rolled in tubular concentric relation and positioned so that the seam of each rolled sheet is spaced 180° apart;
b. bonding means disposed between said sheets; and
c. reinforcing strips positioned in said second member, a first pair of reinforcing strips disposed adjacent said seams, a second pair of said reinforcing strips being spaced 90° from said first pair of reinforcing strips, said reinforcing strips and said sheet member being resistance welded along the length of said tubular structure.

2. A method of fabricating a tubular structure from a pair of flat members including the steps of:
a. applying a bonding agent on adjacent surfaces of said sheets;
b. rolling and positioning said members in concentric relation with the seams of said members being spaced 180° apart;
c. positioning reinforcing members along the inside surface of the inner said flat member;
d. clamping said rolled flat members and said reinforcing members about a mandrel;
e. progressively moving the tubular structure off the mandrel while resistance welding the tubular structure along the length thereof; and,
f. curing said bonding agent.

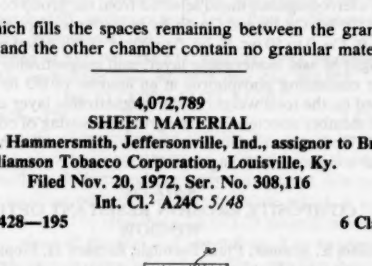
4,072,788

INSULATING ELEMENTS FOR WALLS AND CEILINGS

Peter Herweg, Burscheid, and Werner Barthel, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation-in-part of Ser. No. 727,668, Sept. 29, 1976, abandoned. This application Feb. 28, 1977, Ser. No. 772,805
Claims priority, application Germany, Oct. 3, 1975, 2544280
Int. Cl.[2] B32B *3/10*
U.S. Cl. 428—139 6 Claims

6. The insulating elements for walls and ceilings comprising of: two facing layers which are fixed to a frame, and parallel thereto a perforated foam permeable intermediate layer, the two chambers formed thereby are foam filled and characterized in that one chamber formed by the perforated foam permeable intermediate layer contains a granular material and



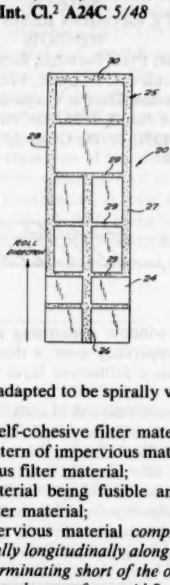
foam which fills the spaces remaining between the granular material and the other chamber contain no granular material.

4,072,789

SHEET MATERIAL

James R. Hammersmith, Jeffersonville, Ind., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Nov. 20, 1972, Ser. No. 308,116
Int. Cl.[2] A24C *5/48*
U.S. Cl. 428—195 6 Claims



1. A sheet material adapted to be spirally wound into a filter rod comprising:
a sheet of porous, self-cohesive filter material;
a predetermined pattern of impervious material deposited on the sheet of porous filter material;
the impervious material being fusible and adapted to be bonded to the filter material;
the pattern of impervious material *comprising a first strip running substantially longitudinally along the sheet from one end thereof and terminating short of the other end, a second strip spaced transversely apart from said first strip and running substantially longitudinally along the sheet and terminating short of the one end, and at least one antispin strip connecting said first and second strips* such that when the sheet material is spirally wound *longitudinally the strips form an* annulet plug *connected by a continuous antispin band* to a disc plug, the outer diameter of the disc being at least as great as the inner diameter of the annulet.

4,072,790

EXTRUDABLE COMPOUNDED POLYVINYL CHLORIDE

Mark D. Creekmore, Akron; Edward T. Vielhaber, Cuyahoga Falls, and Russell P. Carter, Jr., Stow, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 533,583, Dec. 17, 1974, abandoned. This application June 16, 1976, Ser. No. 696,678
Int. Cl.[2] B32B *27/18*
U.S. Cl. 428—220 7 Claims

1. An extruded compounded polyvinyl chloride film having a thickness in the range of about 0.5 to about 4.5 mils prepared by the method which comprises (A) dry blending materials to

a free flowing granular mixture, (B) pelletizing said mixture and (C) extruding said pellatized mixture, as a melt, through a die having a temperature in the range of about 170° C. to about 220° C., said dry blend materials comprising (1) 100 parts by weight particulate polyvinyl chloride resin, about 20 to 32 parts by weight of at least one plasticizer selected from at least one of di(2-ethylhexyl) adipate, epoxidized soyabean oil, epoxidized linseed oil, acetyl tributylcitrate, butylbenzylphthalate, dibutyl sebacate, butyl stearate, acetyl triethyl citrate, p-tert-butyl-phenyl salicylate, butylphthalyl butyl glycolate, di-(2-ethylhexyl)phthalate, diethyl phthalate, diisobutyl adipate, diisooctyl phthalate, dipehenyl-2-ethylhexyl phosphate, ethylphthalyl ethyl glycolate, glycerol monooleate, monoisopropyl citrate, mono-, di- and tristearyl citrate, triacetin (glycerol triacetate), triethyl citrate, 3-(2-xenoyl)-1,2-epoxypropane, 1,3-butylene glycol adipic acid polyester of about 1700 to about 2200 molecular weight terminated with at least one organic acid selected from myristic, palmitic and stearic acids, dicyclohexyl phthalate, di(2-ethylhexyl)-azelate, di-n-hexyl azelate, dihexyl phthalate, diphenyl phthalate, epoxidized butyl esters of linseed oil fatty acids, diisononyl adipate and iisononyl phthalate, (2) from about 0.1 to about 2.5 parts by weight of a pigment having an average particle size in the range of about 2 to about 10 microns selected from pigments comprised of about 50 to about 100 weight percent silica (SiO_2), and corresponding from none to about 50 weight percent other oxides selected from aluminum, magnesium, calcium, iron, potassium and sodium, (3) from about 0.75 to about 7 parts by weight of a heat stabilizer selected from stannous stearate, magnesium stearate and a mixture comprising zinc stearate and calcium stearate in a zinc to calcium weight ratio of about 1:1 to about 3.9:1, (4) from about 0.25 to about 2.5 parts by weight of tris-nonylphenyl phosphite as the chelator, (5) from about 0.2 to about 1.5 parts by weight of a lubricant selected from alcohol esters, amide waxes, fatty acids fatty acid esters, fatty alcohols, glycerol esters, glycol esters metallic stearates and ricinoleates, paraffin waxes, synthetic waxes, polyethylene waxes, modified polyethylene waxes, vinyl ethers, triglycerides, wax acid, and wax esters; (6) from about 2 to about 9 parts by weight of at least one surfactant selected from: polyoxyethylene(20) sorbitan monooleate, the mono and diglycerides of fat-forming fatty acids, a nonylphenoxy polyoxyethylene ethanol containing 4 to 5 moles of ethoxylate, glycerol monooleate, sorbitan monooleate, polyoxyethylene(9-)monooleate, α-alkyl-, α-alkenyl and α-alkylaryl-omega-hydroxypoly(oxyethylene) comprised of at least one of α-(2,4,6-triisobutylphenol)-omega-hydroxypoly(oxyethylene), α-(Z)-9-octadecenyl-omega-hydroxypoly (oxyethylene), and α-alkyl(C_{16}–C_{18})-omega-hydroxypoly(oxyethylene) α-alkyl-omega-hydroxypoly(oxyethylene) derived from ethylene oxide and C_{11}–C_{15} straight chain secondary alcohols, n-alkyl-sulfonate where said alkyl group has 10–18 carbon atoms, α-di-sec-butylphenyl-omega-hydroxypoly(oxyethylene) derived from ethylene oxide and di-sec-butylphenol, α-dodecyl-omega-hydroxypoly (oxyethylene) mixture of dihydrogen phosphate and monohydrogen phosphate esters derived from esterification of the product of ethylene oxide and n-dodecyl alcohol, α-(p-dodecylphenyl)-omega-hydroxypoly(oxyethylene) derived from ethylene oxide and dodecylphenol α-(p-nonylphenyl)-omega-hydroxypoly(oxyethylene) mixture of dihydrogen phosphate and monohydrogen phosphate esters derived from esterification of α-(p-nonylphenyl)-omega-hydroxypoly(oxyethylene) derived from condensation of nonylphenol and ethylene oxide, α-(p-nonylphenyl)-omega-hydroxypoly(oxyethylene) sulfate, ammonium and sodium salts where said nonyl group is a propylene trimer isomer and said poly(oxyethylene) content averages about 4 moles, poly(oxypropylene) block polymer with poly(oxyethylene) having an average molecular weight of about 11,000 to about 18,000, polyoxyethylene(20)sorbitan monostearate, polyoxyethylene (20) sorbitan tristearate, polyoxyethylene(20) sorbitan monooleate, polyoxyethylene(20) sorbitan trioleate, sodium n-alkylbenzene-sulfonate where said alkyl group contains an average of about 10 to about 16 carbon atoms, sorbitan monopalmitate, sorbitan monostearate, sorbitan trioleate, sorbitan tristearate, α-]p-(1,1,3,3,-tetramethylbutyl)phenyl]-omega-hydroxy poly-(oxyethylene) derived from ethylene oxide and p-(1,1,3,3,-tetramethylbutyl)phenol, tetrasodium 28 N-(1,2-dicarboxyethyl)-N-octadecyl-sulfosuccinamate, and α-tridecyl-omega-hydroxypoly(oxyethylene) mixture of dihydrogen phosphate and monohydrogen phosphate esters derived from esterification of the product of ethylene oxide and tridecyl alcohol, (7) and from about 0.1 to about 0.6 part by weight of a slip-antiblock agent selected from at least one of the group consisting of ethylene-N,N'-bis-oleamide, hydrofol glyceride, hydrogenated fish oil, calcium ricinoleate and fatty acid amides selected from amides with aliphatic hydrocarbon chains containing in the range of about 16 to 40 even numbered carbon atoms, said hydrocarbon chains being saturated or partly unsaturated with 1 to 2 carbon-to-carbon double bonds of unsaturation.

4,072,791

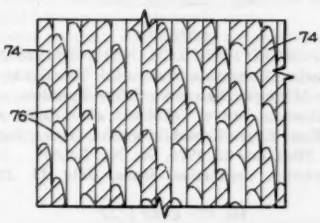
SHEET MATERIAL WITH MULTICOLOR STRIATED PATTERN

Robert E. Randall, Kensington, Conn., assignor to Rowland, Incorporated, Berlin, Conn.

Division of Ser. No. 593,882, July 7, 1975, Pat. No. 4,011,292, which is a division of Ser. No. 457,770, April 4, 1974, Pat. No. 3,920,366. This application Oct. 18, 1976, Ser. No. 733,000

Int. Cl.[2] **B29F** *1/12, 3/12*

U.S. Cl. 428—221 **3 Claims**



1. Differentially colored extruded synthetic thermoplastic sheet material comprising a matrix of synthetic thermoplastic resin and a multiplicity of bands of differentially colored thermoplastic resin encapsulated therein, some of said bands extending angularly to others of said bands so as to intersect therewith and provide a grid pattern, the bands of one angular orientation being disposed at a depth within the matrix different from that of the other angular orientation, a multiplicity of each orientation of said bands being provided across the width of said sheet material, said bands having relatively narrow striations extending longitudinally of the sheet material.

4,072,792

FIBER REINFORCED PLASTIC FLAT PLATES

Kunio Araki; Takashi Sasaki; Yuko Kasahara; Yoshisada Yamashita; Keiichi Yotumoto, all of Takasaki; Hiromi Sunaga, Isezaki; Kiyoshi Tabei, Fujisawa; Kazuo Goto, Takasaki; Kunio Tajiri, Tokyo, and Hirokama Kittaka, Sagamihara, all of Japan, assignors to Nitto Boseki Co., Ltd. and Japan Atomic Energy Research Institute, Tokyo, both of, Japan

Continuation-in-part of Ser. No. 362,306, May 21, 1973, Pat. No. 3,930,098. This application June 25, 1975, Ser. No. 590,067 The portion of the term of this patent subsequent to Dec. 30, 1992, has been disclaimed.

Int. Cl.[2] **B32B** *31/28*

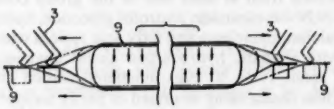
U.S. Cl. 428—246 **15 Claims**

1. A process for continuously preparing a fiber reinforced plastic (FRP) flat plate having no warps, comprising:

covering with film-like sheetings both the top and bottom surface of a continuous FRP flat plate molding material comprising a reinforcing fiber material impregnated with a liquid resin material curable by means of an ionizing radiation;

continuously transporting the covered material in the lengthwise direction;

irradiating the covered material as it is being transported by means of an ionizing radiation until said molding material is cured, said ionizing radiation being β-rays, electron beam, or mixtures thereof, wherein the dose rate is about 0.01–20 Mrad/sec with a total dose of about 0.1–50 Mrad; and



applying tensions to the film-like sheeting covering the FRP molding material in both the lengthwise and the widthwise directions before and in the course of the irradiation, said tensions being in a degree sufficient to press and hold the molding material so as to maintain the thickness thereof uniform and the surfaces thereof smooth before and in the course of radiation.

7. A fiber reinforced plastic (FRP) flat plate laminated with a film-like sheeting, which is prepared according to the process of claim 1.

4,072,793

REINFORCED ION-EXCHANGE MEMBRANE

Itaru Watanabe, Yokohama; Yasumichi Yamakoshi, Tokyo; Hirotsugu Miyauchi, Kawasaki; Sakae Tsushima, and Mitsunobu Fukumoto, both of Yokohama, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed July 15, 1976, Ser. No. 705,431

Claims priority, application Japan, July 23, 1975, 50-101234[U]

Int. Cl.[2] C08J *5/22*

U.S. Cl. 428—255 **5 Claims**

1. In a reinforced ion-exchange membrane comprising a fabric embedded in said ion-exchange membrane, the improvement which comprises using as the fabric a leno-woven fabric with a weave structure in which the numbers of warp yarns are in the range from 16 to 28 per one centimeter of width and those of filling yarns in the range from 8 to 14 per one centimeter of length, the square root of the denier divided by specific gravity of said warp yarn being in the range from 6 to 11 and that of said filling yarn in the range from 8 to 16.

4,072,794

OIL ADSORBENT AND A METHOD OF PRODUCING SAME

Shigeru Tomita; Yoshindo Matsuda; Kazuki Terajima, and Keiji Abe, all of Tokyo, Japan, assignors to Agency of Industrial Science and Technology of Japan, Tokyo, Japan

Filed Nov. 3, 1976, Ser. No. 738,438

Claims priority, application Japan, Dec. 19, 1975, 50-152071

Int. Cl.[2] B05D *5/04, 1/38;* **B32E** *9/04*

U.S. Cl. 428—378 **10 Claims**

6. A method of producing an oil adsorbent which comprises treating natural fibers selected from the group consisting of vegetable fibers and animal fibers with a paraffin emulsion, drying the so treated fibers to form a paraffin layer thereon, treating the resulting coated fibers with a latex and then curing said latex to coat said paraffin layer with a rubber layer.

4,072,795

THIN FILM ELECTROSTATIC EPOXY POWDER COATING PROCESS AND THE RESULTING ARTICLE

Charles M. Noonan, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 468,336, May 8, 1974, Pat. No. 4,009,223.

This application Oct. 4, 1976, Ser. No. 729,232

Int. Cl.[2] B32B *15/02, 15/20*

U.S. Cl. 428—379 **26 Claims**

1. A method of coating a metallic object with a coating powder comprising: (I) applying a coating powder to said metallic object with an electrostatic means selected from the group consisting of a gun and a fluidized bed, said coating powder being made by

(A) dry mixing a composition which comprises:

(1) a first diglycidyl ether of bisphenol A having an E.E.W. of about 400 to about 900 and a melting point of about 70° to about 110° C;

(2) a second diglycidyl ether of bisphenol A having an E.E.W. of about 750 to about 1400 and a melting point of about 100° to about 130° C, where said second diglycidyl ether is different from said first diglycidyl ether and the weight ratio of said first diglycidyl ether to said second diglycidyl ether is about 1 to 1 to about 12 to 1;

(3) about 10 to about 60% by weight based on the weight of the total composition of an epoxy ester, the epoxy portion of said ester being derived from a diglycidyl ether of bisphenol A having an E.E.W. of about 400 to about 900 and a melting point of about 70° to about 110° C, and the ester portion being derived from a dibasic acid having the formula $HOOC—(CH_2)_m — COOH$, where m is about 18 to about 54; and

(4) about 2 to about 8 phr of a curing agent for said diglycidyl ethers;

(B) extruding said composition;

(C) cooling said composition to form a solid; and

(D) grinding said composition into a powder having a particle size of about 15 to about 74 microns; (II) curing said coating powder at about 125° to about 200° C for about 1 to about 10 minutes.

16. An article comprising a substrate having thereon a coating comprising a cured film less than 2 mils thick of a coating powder made by

(A) dry mixing a composition which comprises:

(1) a first diglycidyl ether of bisphenol A having an E.E.W. of about 400 to about 900 and a melting point of about 70° to about 110° C;

(2) a second diglycidyl ether of bisphenol A having an E.E.W. of about 750 to about 1400 and a melting point of about 100° to about 130° C, where said second diglycidyl ether is different from said first diglycidyl ether and the weight ratio of said first diglycidyl ether to said second diglycidyl ether is about 1 to 1 to about 12 to 1;

(3) about 10 to about 60% by weight based on the weight of the total composition of an epoxy ester, the epoxy portion of said ester being derived from a diglycidyl ether of bisphenol A having an E.E.W. of about 400 to about 900 and a melting point of about 70° to about 110° C, and the ester portion being derived from a dibasic acid having the formula $HOOC—(CH_2)_m — COOH$, where m is about 18 to about 54; and

(4) about 2 to about 8 phr of a curing agent for said diglycidyl ethers;

(B) extruding said composition;

(C) cooling said composition to form a solid; and

(D) grinding said composition into a powder having a particle size of about 15 to about 74 microns.

4,072,796

PROCESS FOR HYDROPHOBIZATION OF FINELY DIVIDED SILICA AND SILICATES USING PREPOLYCONDENSED ORGANOSILANE

Helmut Reinhardt, Rodenkirchen; Karl Trebinger, and Gottfried Kallrath, both of Wesseling, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed May 29, 1975, Ser. No. 581,890
Claims priority, application Germany, July 25, 1974, 2435860
Int. Cl.[2] B32B *17/00*; C01B *33/18*
U.S. Cl. 428—405 14 Claims

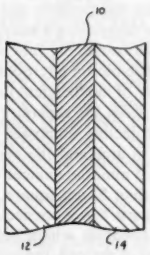
1. In a process for the production of a finely divided hydrophobic silica or silicate by precipitation of an alkali silicate solution with a mineral acid or acidic metal salt solution and treatment of the acidic wet suspension at a temperature of about 50° to about 90° C. with an organohalosilane as a hydrophobizing agent, filtering, washing and drying of the organohalosilane treated precipitate and then tempering at about 300° to 400° C. the improvement comprising employing as the organohalosilane either a prepolycondensed organohalosilane or a prepolycondensed mixture of organohalosilanes, said prepolycondensed organohalosilane or mixture thereof having been prepared by reacting said organohalosilane or mixture of organohalosilanes with a stoichiometrical amount of water said prepolycondensed organo-silane having up to 6 silicon atoms.

4,072,797

DIFFUSION BARRIER AND SEPARATION SUBSTANCE FOR METAL PARTS ADJOINING EACH OTHER IN AN OXYGEN FREE ATMOSPHERE

Hans Gass, Neuchatel; Hans Erich Hintermann, Ins, both of Switzerland, and Hartmut Griepentrog, Oberhausen, Germany, assignors to Laboratoire Suisse de Recherches Horlogeres, Switzerland and Gutehoffnungshutte Sterkrade Aktiengesellschaft, Germany

Filed Aug. 4, 1975, Ser. No. 601,538
Claims priority, application Germany, Aug. 28, 1974, 2441260
Int. Cl.[2] C01B *21/06, 35/08*; B32B *15/04*
U.S. Cl. 428—409 4 Claims



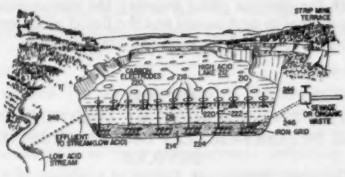
1. A diffusion barrier and separation substance for metal parts adjoining each other in an oxygen-free, inert, and preferably in a helium-containing atmosphere such as is used in a closed-cycle high-temperature reactor, comprising first and second metal parts with a hexagonally crystallized boron nitride forming a diffusion barrier and separation between said parts, wherein said hexagonally crystallized boron nitride is applied as a suspension to the adjoining metal parts, said metal parts being of a nickel-containing alloy and having smooth boundary surfaces therebetween, said parts being mounted for sliding relative movement in a thermoelastic suspension.

4,072,798

BIOELECTRIC NEUTRALIZATION OF ACID WATERS

Frederick D. Sisler, Washington, D.C., and Frank E. Senftle, Chevy Chase, Md., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed July 26, 1977, Ser. No. 819,518
Int. Cl.[2] H01M *8/16*
U.S. Cl. 429—2 24 Claims



1. A process for the bioelectrical neutralization of a body of water having a bottom of anaerobic mud and an acid supernatant liquid, said liquid consisting essentially of acid sulfate-containint water, comprising the step of placing in the body of water an apparatus comprising:

A. a buoy;

B. an upper electrode suspended from the buoy;

C. a flexible insulated electrical conductor conductively attached to the upper electrode; and

D. a lower electrode conductively attached to the insulated electrical conductor;

wherein the buoy rides on the surface of the body of water;

wherein the upper electrode is suspended in the acid supernatant liquid;

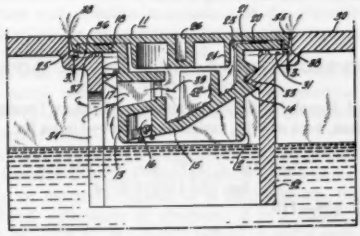
wherein the lower electrode is embedded in the anaerobic mud.

4,072,799

VENT PLUG SYSTEM FOR BATTERIES

Jeffrey S. Leeson, South Euclid, and Joseph F. Szabo, North Olmsted, both of Ohio, assignors to ESB Incorporated, Philadelphia, Pa.

Filed Apr. 13, 1977, Ser. No. 787,020
Int. Cl.[2] H01M *2/12*
U.S. Cl. 429—82 19 Claims



1. A vent plug for insertion into a vent well of an individual cell of a battery, wherein said vent plug is designed to separate the gaseous and liquid phases of the fluid passing through it from the particular battery cell, said vent plug comprising:

a. a body portion for insertion into the vent well, said body portion having a predetermined length;

b. a bottom portion connected to the lower portion of the body portion;

c. at least one drain opening located in or near the bottom portion;

d. cap means secured over the upper portion of the body portion, thereby defining an internal enclosure inside the body portion;

e. inlet means for directing fluid flow from the battery cell

into the internal enclosure in a horizontal direction and at a point above the drain opening;

f. discharge port means located in the upper portion of the vent plug, for permitting fluid within the internal enclosure to enter the atmosphere; and

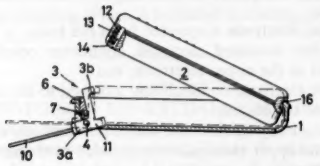
g. vertical baffle means having at least a portion of said means opposite the inlet means, so that as fluid flows into the vent plug enclosure through the inlet opening its flow is diverted by said baffle means, thereby causing the liquid phase of the fluid to be separated from the gaseous phase, with the gaseous phase entering the atmosphere through the discharge port means and the liquid phase returning to the particular cell through the drain opening.

4,072,800

ELECTRIC STORAGE BATTERY ARRANGEMENT FOR USE IN ELECTRICALLY DRIVEN PROSTHETIC DEVICES

Peter Gammer, Duderstadt, Germany, assignor to Otto Bock Orthopadische Industrie K.G., Duderstadt, Germany

Filed Sept. 21, 1976, Ser. No. 725,192
Claims priority, application Germany, Sept. 26, 1975, 2542933
Int. Cl.[2] H01M *2/10*
U.S. Cl. 429—97 **15 Claims**



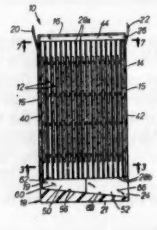
1. An electric storage battery arrangement for use in a prosthetic device of the type having an electric drive and an electric circuit for the same, comprising, in combination, a mounting frame adapted to be mounted on the prosthetic device; a storage battery interchangeably insertable into said mounting frame and having a pair of electric terminals configurated with respective slots; and a pair of electric contacts arranged in the electric circuit and constructed as contact blades receivable in said respective slots for establishing electric contact with said electric terminals of said storage battery when the latter is inserted into said mounting frame.

4,072,801

DEFERRED ACTION BATTERY HAVING IMPROVED BOTTOM PORT COVER

Leonard Joseph Burant, Milwaukee, and James Thomas Daley, Grafton, both of Wis., assignors to Globe-Union Inc., Milwaukee, Wis.

Filed Apr. 4, 1977, Ser. No. 784,254
Int. Cl.[2] H01M *6/34*
U.S. Cl. 429—110 **8 Claims**



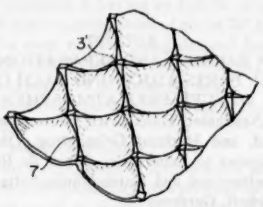
1. A deferred action battery comprising: a casing having a chamber; an electrode assembly disposed within said chamber and including a plurality of stacked parallel electrode plates and spacing means disposed intermediate said electrode plates for maintaining predetermined electrolyte receiving spacings between said electrode plates, and said electrode assembly having opposite ends; and a bottom port cover positioned adjacent one of said opposite ends, said bottom port cover comprising a body having a plurality of sides and an upper surface positioned adjacent said one of said opposite ends, a water inlet opening in one of said sides, and a precipitate receiving cavity in said upper surface and in communication with at least one of said electrolyte receiving spaces for receiving precipitate from said one of said electrolyte receiving spaces, and a channel between said opening and said precipitate receiving cavity, said channel being transverse to said parallel electrode plates, and whereby upon immersion of said batteries in electrolyte, electrolyte may flow through said water inlet opening and said channel into said precipitate receiving cavity and into said spaces and precipitate can be emitted from said battery through said cavity and said water inlet opening.

4,072,802

STORAGE BATTERY, SEPARATOR THEREFOR

Kazuo Murata; Shiro Tanso, and Junzo Yamao, all of Takatsuki, Japan, assignors to Yuasa Battery Company Limited, Takatsuki, Japan

Continuation-in-part of Ser. No. 592,344, July 1, 1975, abandoned. This application Jan. 27, 1977, Ser. No. 763,038
Claims priority, application Japan, July 11, 1974, 49-79916
Int. Cl.[2] H01M *2/18*
U.S. Cl. 429—147 **18 Claims**



1. A lead-acid storage battery comprising a container, at least one set of battery plates, one plate of the set being a positive plate and another being a negative plate, and a separator interposed between the positive and negative plates, the microporous separator comprising a microporous sheet of heat meltable synthetic resin containing film of less than 0.5 mm in thickness and having submicron micropores, said microporous sheet having a plurality of independent limited embossed parts projecting outwardly from the separator toward the positive plate, each of said projecting embossed parts being substantially less than 1 cm^2 in area and the height of the embossed parts being less than 1.5 mm, the number of embossed parts on the sheet being more than 50 per square 100 cm^2 of sheet, the projecting embossed parts being connected substantially with projecting embossed channels which help gas formed in the cell escape upward out of the cell, the height of the projecting embossed channels being lower than the height of said projecting embossed parts, and the pores of said embossed parts being at least partially closed.

4,072,803

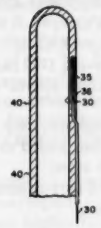
LITHIUM HALIDE CELL

Alan Arthur Schneider, Baltimore, Md., assignor to Catalyst Research Corporation, Baltimore, Md.

Filed Aug. 20, 1976, Ser. No. 716,339
Int. Cl.[2] H01M *2/26*
U.S. Cl. 429—181 **8 Claims**

1. A lithium halide battery comprising a lithium anode re-

ceiving vessel; a cathode current collector having a nonconductive positioning frame and a lead attached thereto, said lead having insulation over a substantial portion and being embedded within the lithium of said vessel throughout a substantial



part of the insulated portion of said lead; a cathode material positioned in contact with said cathode current collector; and a lithium halide electrolyte coextensively positioned between and in contact with said anode receiving vessel and cathode material.

4,072,804

CROSS-LINKABLE EPOXY RESIN CASTING COMPOUNDS

Wolfgang Kleeberg, Erlangen; Heinz Hacker, and Klaus-Robert Hauschildt, both of Nurnberg, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 26, 1975, Ser. No. 617,234

Claims priority, application Germany, Sept. 30, 1974, 2446697

Int. Cl.² C08G *59/42*

U.S. Cl. 526—11.2 **14 Claims**

1. An epoxy casting composition capable of being converted to insoluble and unmeltable crosslinked polymers by polyaddition and polymerization comprising a mixture of a polyepoxide, a polycarboxyl-containing compound selected from the group consisting of a polycarboxylic acid, a polycarboxylic acid anhydride and mixtures thereof, a polymerization-initiating radical former, and maleic acid monoallyl ester, said ester being present in said mixture as:

(a) an adduct to said polyepoxide, said adduct containing free epoxy functions; or

(b) free maleic acid monoallyl ester; or

(c) a combination of (a) and (b).

4,072,805

METHOD FOR PRODUCING POLYMERS

František Hrabák; Milan Bezdék; Vlasta Hynková, and Karel Bouchal, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Continuation of Ser. No. 281,285, Aug. 17, 1972, abandoned, which is a continuation of Ser. No. 187,813, Oct. 8, 1971, abandoned. This application Oct. 7, 1974, Ser. No. 512,428

Claims priority, application Czechoslovakia, Oct. 9, 1970, 6829/70

Int. Cl.² C08F *8/18, 8/34*

U.S. Cl. 526—43 **11 Claims**

1. A process for forming polymer gel by chemically connecting at least two polymeric molecules each of which contains at least one chemically bound tertiary amino group and which polymeric molecules are polymers and copolymers selected from the group consisting of poly (dimethylaminoethyl) methacrylate and poly (dimethylaminoethyl) acrylate, comprising the steps of mixing said polymeric molecules together, contacting the mixture with a material selected from the group consisting of elemental halogens, halogen containing organic compounds and inorganic halogen compounds of the elements of the third, fourth, fifth, sixth, seventh and eighth groups of the Periodic Table in an amount and for a time sufficient to cause substantially complete reaction of the tertiary amino groups in the mixture of polymeric molecules with said contacting material to form a connected polymeric product and thereafter recovering said product.

4,072,806

NOVEL VINYL CHLORIDE POLYMERS AND PROCESS FOR THEIR PRODUCTION

Mani Ravey; Leonard Marshall Shorr, both of Haifa, Israel, and Jacques A. Waterman, deceased, late of Haifa, Israel (by Jacob Frankel, administrator), assignors to IMI (TAMI) Institut for Research and Development, Haifa, Israel

Filed Feb. 23, 1976, Ser. No. 660,250

Claims priority, application Israel, Feb. 21, 1975, 46681

Int. Cl.² C08F *14/06*

U.S. Cl. 526—89 **13 Claims**

1. In a process for the production of thermoplastic vinyl chloride polymers having a Vicat temperature of at least 78° C. and improved flow characteristics, by free radical initiated polymerization of a mixture of monomers consisting of (a) vinyl chloride and (b) a monomer copolymerizable therewith the improvement which comprises employing as (b) from 50 ppm to 1% by weight of the mixture of at least one chain branching agent selected from the group consisting of triallyl cyanurate diallyl phthalate and vinyl crotonate, and conducting the polymerization in the presence of from 500 ppm to 5% by weight of the mixture of at least one chain transfer agent selected from the group consisting of unsubstituted and substituted aliphatic aldehydes, unsubstituted and substituted mercaptans, and C_1 and C_2 hydrocarbons containing 3 or 4 atoms of chlorine or bromine in the molecule.

4,072,807

MOLECULAR WEIGHT REDUCTION OF UNSATURATED POLYMERS

Carl A. Uraneck, and James D. Brown, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 352,741, April 19, 1973, Pat. No. 3,917,576, which is a continuation of Ser. No. 72,241, Sept. 14, 1970, abandoned. This application July 31, 1975, Ser. No. 600,551

Int. Cl.² C08C *19/26;* C08F *8/42*

U.S. Cl. 526—48.1 **38 Claims**

1. The process of decreasing the molecular weight of a polymer wherein said polymer is a polymer of a cyclomonoolefin, wherein said process comprises contacting said polymer with an effective amount of a homogeneous olefin disproportionation catalyst under contacting conditions of temperature and pressure at which said disproportionation catalyst is active for the olefin reaction, whereby the molecular weight of said polymer is decreased,

wherein said homogeneous catalyst comprises (a) a transition metal compound and (b) an organometallic compound in a ratio of said (b):(a) effective to decrease said molecular weight,

wherein said (a) transition metal compound is represented by the formula $(L_aM_cZ_d)_x$ wherein each L represents an organic or inorganic ligand; M is molybdenum, tungsten, rhenium, ruthenium or rhodium; Z is a halide, —CN, —SCN, —OCN, or $—SnCl_3$ radical; a and d each represent a number 1 to 5, c represents a number 1 to 4; x represents a number indicative of the polymeric state of the compound; and wherein at least one of L and Z is present in said $(L_aM_cZ_d)_x$, and

wherein said (b) organometallic adjuvant comprises (1) R_eAlX_f, (2) a mixture of compounds of (1), (3) a mixture of one or more of AlX_3 or R_eAlX_f compounds with one or more compounds represented by the formula $R_g{}^1M^1X_h$, (4) $R_gM^1Y_h$ compound, (5) AlX_3 compound, or (6) $M^1M^2H_r$ wherein each R is an aromatic or saturated aliphatic hydrocarbon radical having up to 20 carbon atoms including alkoxy and halo derivatives thereof, wherein each X is halogen, Y is halogen or hydrogen, each M^1 is a metal of Group IA, IIA, IIB, or IIIA, except Al, each M^2 is a metal

of Group IA, IIA, IIB, or IIIA; *e* represents a number of 1 to 3, *f* represents a number of 0 to 2, such that the sum of *e* and *f* equals 3; *g* represents a number of 1 to 3, *h* represents a number of from 0 to 2, such that the sum of *g* and *h* is equal to the valence of M^1, *j* is an integer equal to the sum of the valences of M^1 and M^2.

4,072,808

PROCESS FOR PREPARING ELASTOMERS FOR PRESSURE-SENSITIVE ADHESIVE APPLICATION

Pallavoor R. Lakshmanan, Houston, Tex.; Harold E. Swift, Gibsonia, and Ching Yong Wu, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Dec. 29, 1976, Ser. No. 755,161
Int. Cl.[2] C08F *4/70, 240/00*
U.S. Cl. 526—76 **18 Claims**

1. In a process for preparing an elastomer comprising copolymerized C_5-hydrocarbons prepared from a hydrocarbon mixture containing C_5-monoolefinic hydrocarbons, C_5-diolefinic hydrocarbons C_5-paraffins, C_6-paraffins and benzene which comprises (A) heat-soaking said hydrocarbon mixture at a temperature sufficient to dimerize cyclopentadiene; (B) separating the resulting hydrocarbon mixture from the cyclopentadiene dimer; (C) copolymerizing the resulting hydrocarbon mixture in the presence of a catalyst which comprises an iron complex, a trialkyl aluminum and a bidentate ligand capable of both pi and sigma bonding to form an elastomer.

4,072,809

CATALYST AND PROCESS FOR THE POLYMERIZATION OF ALPHA-OLEFINS

John B. Rogan, Glen Ellyn, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Continuation-in-part of Ser. No. 434,486, Jan. 18, 1974, abandoned. This application Mar. 3, 1975, Ser. No. 554,599
Int. Cl.[2] C08F *4/66, 10/06*
U.S. Cl. 526—136 **22 Claims**

1. A polymerization catalyst composition which comprises:
(a) an alkylaluminum compound selected from the group consisting of a trialkyl aluminum, a mixture of a trialkyl aluminum and an alkylaluminum dichloride or dibromide, a mixture of a trialkyl aluminum and a dialkylaluminum chloride or bromide and a dialkylaluminum chloride or bromide;
(b) an effective amount up to about 10 mol percent of hydrogen sulfide based upon the amount of alkylaluminum compound present;
(c) an activated titanium trichloride; and
(d) an effective amount of an additive which is selected from the group consisting of trihydrocarbylphosphites, sterically hindered, lower alkyl substituted, cyclic, tertiary amines and sterically hindered, lower alkyl substituted, cyclic, amine oxides;
said amounts effective to result in a substantial reduction of alkane solubles while not seriously affecting the total yield of polymer.

4,072,810

COUPLED PEROXIDES

Antonio Joseph D'Angelo, Buffalo; Orville Leonard Mageli, and Chester Stephen Sheppard, both of Kenmore, all of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 737,359, June 17, 1968, Pat. No. 3,725,455. This application Mar. 16, 1973, Ser. No. 342,110
Int. Cl.[2] C08F *4/00, 112/08*
U.S. Cl. 526—230 **4 Claims**

1. In the process for preparing solid polymers or copolymers by the polymerization of vinyl monomers using a free radical initiator, the improvement which comprises using as said initiator a peroxide of the formula R—W—R′ where:
a. W is selected from —C(=O)— or —C(=O)R^4C(=O)—;
b. R and R′ are identical and are selected from $R_3OO—C(R_1)(R_2)—R^3O—$, $(R_3OO)_2C(R_4)—R^2O—$, $R_3OOC(=O)R^3O—$, $R_3OOC(=O)OR^3O—$, $R_1OC(=O)OO—C(R_1)(R_2)—R^2O—$, and $R_1C(=O)OO—C(R_1)(R_2)—R^2O—$;
c. R_1 and R_2 are aliphatic having 1–12 carbon atoms, cycloaliphatic having 3–12 carbon atoms, or aromatic having 6–12 carbon atoms;
d. R_3 is aliphatic or cycloaliphatic, each having 4–10 carbon atoms and the carbon atom joined to the peroxy oxygen atom is a tertiary carbon atom;
e. R_4 is aliphatic having 1–10 carbon atoms or cycloaliphatic having 3–12 carbon atoms;
f. R_6 is H or lower alkyl;
g. Y is the diradical O, S, or N-R_6;
h. R^2 is an aliphatic diradical having 1–10 carbon atoms or a cycloaliphatic diradical having 3–12 carbon atoms;
i. R^3 is aliphatic diradical having 1–10 carbon atoms, cycloaliphatic diradical having 3–12 carbon atoms, aromatic diradical having 6–12 carbon atoms, or araliphatic diradical having 7–16 carbon atoms; and
j. R^4 is selected from R^3, YR^3Y, $R^3C(=O)YR^3YC(=O)R^3$, $YR^3YC(=O)YR^3YC(=O)YR^3Y$, $YR^3YC(=O)R^3C(=O)YR^3Y$, $YR^3C(=O)YR^3C(=O)YR^3Y$, $YR^3C(=O)YR^3YC(=O)R^3Y$, $YR^3YC(=O)YR^3Y$, $YR^3YC(=O)R^3Y$ and YR^3YR^3Y.

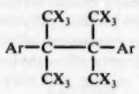
4,072,811

NOVEL CHLORINATED DICUMENE INITIATORS

Hendrik H. J. Oosterwijk, Diepenveen; Eduard P. Magre, Wiersum, and Wilhelmus M. Beyleveld, Olst, all of Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

Division of Ser. No. 621,985, Oct. 14, 1975, Pat. No. 4,036,898. This application Mar. 11, 1977, Ser. No. 776,794
Claims priority, application Netherlands, Oct. 17, 1974, 7413633
Int. Cl.[2] C08F *2/00, 12/02, 110/02, 218/18*
U.S. Cl. 526—346 **3 Claims**

1. A method for free-radical polymerization of ethylenically-unsaturated monomers containing at least 50% by weight of an aromatic vinyl group, an allyl compound or ethylene comprising employing as initiator a compound corresponding to the formula:



wherein Ar is an aryl group and X is hydrogen or chlorine and provided that at least 1 but not more than 5 X groups are chlorine.

4,072,812

POLY(HIGHER-1-OLEFIN/PROPYLENE) COPOLYMERS AS HOT-MELT PRESSURE-SENSITIVE ADHESIVES

Richard L. McConnell, Kingsport; Doyle A. Weemes, Greeneville, and Frederick B. Joyner, Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 563,534, March 31, 1975, Pat. No. 3,954,697. This application Feb. 2, 1976, Ser. No. 654,317

The portion of the term of this patent subsequent to May 4, 1993, has been disclaimed.

Int. Cl.[2] C08F *210/06, 210/08, 210/14*

U.S. Cl. 526—348.2 12 Claims

1. A hot melt, pressure sensitive adhesive comprising an amorphous propylene/higher 1-olefin copolymer containing 40 to 60 mole percent higher 1-olefin having a melt viscosity range at 190° C. of 10,000 cp. to 75,000 cp., a density of 0.85 to 0.86, a glass transition temperature of −30° to −45° C., and having no melting point measurable by Differential Scanning Calorimetry, wherein said higher 1-olefin is at least two members of the group consisting of 1-hexene, 1-heptene, 1-octene, 1-nonene and 1-decene.

4,072,813

POLY(HIGHER-1-OLEFIN/1-BUTENE) COPOLYMERS AS HOT-MELT PRESSURE-SENSITIVE ADHESIVES

Richard L. McConnell, Kingsport; Doyle A. Weemes, Greeneville, and Frederick B. Joyner, Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 11, 1976, Ser. No. 657,347

The portion of the term of this patent subsequent to May 4, 1993, has been disclaimed.

Int. Cl.[2] C08F *210/08, 210/14*

U.S. Cl. 526—348.2 22 Claims

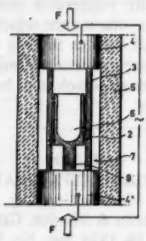
1. A hot melt, pressure sensitive adhesive comprising an amorphous 1-butene/higher 1-olefin copolymer or amorphous 1-butene/propylene/higher 1-olefin copolymer containing 40 to 60 mole percent higher 1-olefin hving a melt viscosity range at 190° C. of 10,000 cp. to 75,000 cp., a density of 0.85 to 0.86, a glass transition temperature of −30° to −45° C., and having no melting point measurable by Differential Scanning Calorimetry, wherein said higher 1-olefin is at least one member of the group consisting of 1-hexene, 1-heptene, 1-octene, 1-nonene and 1-decene.

4,072,814

FURNACE FOR MELTING METAL BY THE JOULE EFFECT

Pierre Gérard Boillot, Le Pecq, France, assignor to Institut de Recherches de la Siderurgie Francaise Irsid, Saint-Germain-en-Laye and Instruments S.A., Ivry-sur-Seine, both of, France

Filed May 10, 1976, Ser. No. 685,049
Int. Cl.[2] H05B *3/40*
U.S. Cl. 13—20 3 Claims



1. A device for melting a metal by Joule effect to enable extraction of the gases which the metal contains, said device comprising:

a hollow, tubular, vertical body constituted of graphite having high mechanical resistance and constituting a heater resistor,

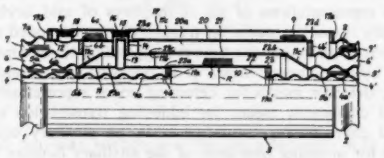
an upper and a lower heating electrode between which said tubular body is clamped, and a crucible of heat-conductive, porous material disposed in the interior of the hollow body and in open electrical circuit with said electrodes, said crucible being hollow for containing metal to be melted and having a bottom for said metal, and means for positioning said bottom above the lower electrode in thermal isolation therewith.

4,072,815

CABLE CONNECTION FOR LOW-TEMPERATURE CABLE

Ullrich Hildebrandt, Munich, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Aug. 6, 1976, Ser. No. 712,321
Claims priority, application Germany, Aug. 8, 1975, 2535487
Int. Cl.[2] H01B *12/00*
U.S. Cl. 174—15 S 10 Claims



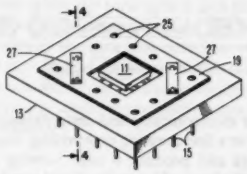
1. A cable junction comprising a first cable end and a second cable end, each of said cable ends comprising a first duct defining a central compartment and an electrical conductor and traversed by a first coolant, a second duct around said first duct and defining therewith an inner vacuum compartment, a third duct surrounding said second duct and defining therewith another coolant-traversed compartment, and a fourth duct surrounding said third duct and defining therewith an outer vacuum compartment; the compartments of one of said cable ends being offset radially outwardly in relation to the compartments of the other of said cable ends, the vacuum compartments of said one cable end axially overlapping the corresponding vacuum compartments of said other cable end, rigid wall means separatng the overlapping vacuum compartments from each other and said rigid wall means forming part of a rigid connection of said ducts of said other cable end from the interior to the exterior.

4,072,816

INTEGRATED CIRCUIT PACKAGE

Ronald Walker Gedney, and John Rasile, both of Endicott, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 13, 1976, Ser. No. 750,056
Int. Cl.[2] H05K *7/02*
U.S. Cl. 174—52 FP 5 Claims



1. A metallized ceramic package for high speed circuitry including

a ceramic substrate,

metallic circuit lines on said substrate,

an integrated circuit chip positioned on said substrate and connected to said circuit lines,

a plurality of connection pins passing through said ceramic substrate, each pin having a connection to one of said circuit lines,

a ground plane of conducting material positioned on top of said substrate, said ground plane having holes therein over said connections and over said integrated circuit chip whereby said ground plane can be in close proximity to a substantial portion of said substrate, and

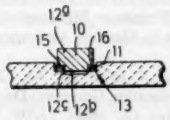
a layer of insulating material between said ground plane and said circuit lines.

4,072,817

METHOD OF MAKING SEMI-CONDUCTOR MOUNTS

John Stuart Waite, Powys, England, assignor to GKN Floform Limited, Powys, Great Britain

Filed Dec. 20, 1976, Ser. No. 752,290
Claims priority, application United Kingdom, Jan. 8, 1976, 597/76
Int. Cl.[2] H05K *5/00*
U.S. Cl. 174—52 H 13 Claims



1. A method of making a mount for a solid state semi-conductor comprising a mounting part secured to a body element comprising the steps of positioning a mounting part in contact with a body element, in a jig, the jig engaging the mounting part and having good thermal conductivity, subjecting the jig to a temperature above the melting point of the body element for a time to cause application of heat to the body element in the region of the interface between the body element and the mounting part by conduction of heat from the jig through the mounting part to the body element to raise the temperature of the region of the interface above its melting point to cause localized melting of the body element only in said region of the interface to cause fusion bonding of the mounting part of the body element and thereafter cooling the jig at a rate such that

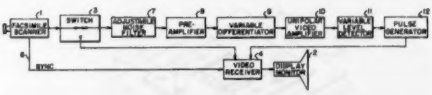
the remainder of the body element remains below its melting point.

4,072,818

SYSTEM FOR CONVERTING TONAL IMAGES TO LINE DRAWINGS

John W. Coviello, Owings Mills, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 10, 1975, Ser. No. 585,641
Int. Cl.² H04N *7/13*
U.S. Cl. 358—284 **6 Claims**



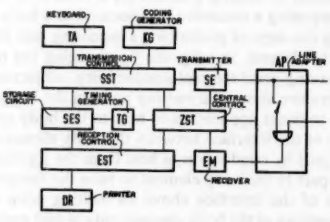
1. A device for electronically and instantaneously converting a tonal image to a line drawing comprising, scanning means to scan said image and produce a time varying video signal representative of the level of intensity of said tonal image as the image is scanned, a passive differentiator responsive to said video signal for producing substantially instantaneously a first intermediate signal which consists of a pulse for each change in level of said video signal, said pulses being representative of the approximate first time derivative of the time varying signal and being positive for any increase in level and negative for any decrease in level, a unipolar amplifier to amplify said first intermediate signal and produce a second intermediate signal, said second intermediate signal consisting of amplified pulses of the same polarity corresponding to the respective ones of positive and negative pulses of said first intermediate signal, an adjustable level detector responsive to all pulses of said second intermediate signal which are above a predetermined adjustable level for producing a third intermediate signal, a pulse generator responsive to said third intermediate signal for producing an output signal consisting of a pulse of constant magnitude and width for each pulse of said third intermediate signal, and a video receiver having video display means responsive to said output signal for displaying a line drawing, said video receiver being synchronized with said scanning means, whereby a line drawing of a tonal image may be instantaneously displayed by a video receiver and the selection of lines in the line drawing in accordance with its respective significance in the tonal image may be instantaneously made by manually adjusting the level detector.

4,072,819

CIRCUIT ARRANGEMENT FOR STORING INFORMATION FORMED OF TELETYPE CHARACTERS

Martin Ludwig, and Wennemar Eickenscheidt, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Oct. 4, 1976, Ser. No. 729,462
Claims priority, application Germany, Dec. 19, 1975, 2557494
Int. Cl.² H04L *13/08*
U.S. Cl. 178—17.5 **13 Claims**



1. A circuit arrangement for storing messages formed of Teletype characters in a Teletype system having a reception control which can be supplied with Teletype characters from a Teletype line and an input device, and which contains a transmission control which can emit Teletype characters towards a Teletype line and the reception control, comprising:

(a) a read and write memory unit supplied with Teletype characters from received and written-in messages via the reception control; and

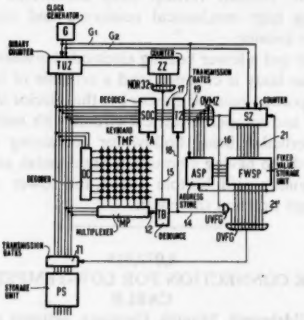
(b) a read and write memory means in said memory unit having electronically triggerable memory elements for storage of Teletype characters which are not changed when an operational voltage feeding the memory unit is switched off, said memory means emitting the Teletype characters of a message which is to be transmitted to the transmission control.

4,072,820

APPARATUS FOR CODING INPUT DATA CHARACTERS

Gerd-Joachim Günther, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 24, 1976, Ser. No. 726,405
Claims priority, application Germany, Sept. 25, 1975, 2542864
Int. Cl.² G06F *3/14*
U.S. Cl. 178—23 R **6 Claims**



1. Apparatus for the input coding of keyboard data characters comprising, a keyboard having a plurality of row lines and a plurality of column lines, means for interconnecting a row line with a column line in response to the depression of a key of the keyboard, counter means for sequentially manifesting coded representations of all of the keys of said keyboard, normally operative means for transmitting a said coded representation to an output at a time corresponding to the representation by said counter means of an operated key of said keyboard, detector means for detecting codes representative of special characters, means for inhibiting transmission of the special character-representative code, an auxiliary counter, means for initiating operation of the auxiliary counter in response to detection of a code representative of a special character, and means interconnected with said auxiliary counter for transmitting coded representations produced by said main counter at times when said representations correspond to plural code representations to be substituted for said special character-representative code.

4,072,821

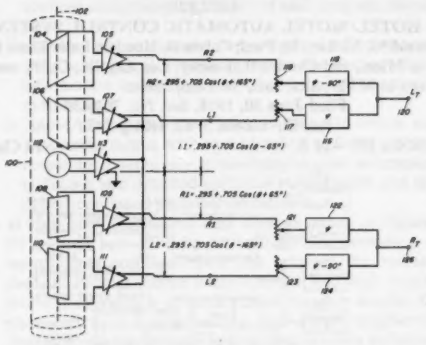
MICROPHONE SYSTEM FOR PRODUCING SIGNALS FOR QUADRAPHONIC REPRODUCTION

Benjamin B. Bauer, Stamford, Conn., assignor to CBS Inc., New York, N.Y.

Filed May 10, 1976, Ser. No. 685,065
Int. Cl.² H04R *5/00*
U.S. Cl. 179—1 GQ **10 Claims**

10. An array of at least four microphones supported in close

proximity with each other and each operative to produce when disposed within a field of surround-sound sources an electrical signal defined by a predetermined limacon sensitivity pattern the directions of maximum sensitivity of said at least four microphones being oriented at different predetermined angles relative to a 0° reference direction, a first and a second



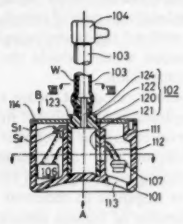
of said signals defining patterns of substantially similar shape whose directions of maximum sensitivity are oriented at about −65° and +65°, respectively, from said reference direction, and a third and a fourth of said signals defining patterns of substantially similar shape whose directions of maximum sensitivity are oriented at about −165° and +165°, respectively, from said reference direction.

4,072,822

TWO-WAY STETHOSCOPE FOR DIRECT AND AMPLIFIED SOUND

Yoshihito Yamada, 2-9, Imagawa 4-chome, Suginami-ku, Tokyo, Japan

Filed Sept. 27, 1976, Ser. No. 727,087
Int. Cl.² A61B 7/04
U.S. Cl. 179—1.5 T **3 Claims**



1. A two-way stethoscope, for use selectively with direct and amplified transmission of sound comprising:

(i) a hollow generally cylindrical contactor body having an end wall with a plurality of sound pickup holes therein, and having an inner cylindrical wall with a plurality of communication holes therein;

(ii) a hollow cylindrical turn tube having a plurality of communiction holes therein, said turn tube being engaged within said inner cylindrical wall of said contactor body;

(iii) a sound tube having two ends, said tube being connected at one end to said turn tube and communicating with the interior thereof;

(iv) at least one earphone provided at the other end of said sound tube, said earphone being hollow and including an electromagnet and a diaphragm;

(v) a microphone means, for transforming sound entering through said pickup holes into electric signals, arranged in the hollow space of said contactor body;

(vi) an amplifying means connected to said microphone means;

(vii) an electric current source for said amplifying means;

(viii) a conducting lead integral with said sound tube, said lead connecting at one end to said amplifying means and at the other end to said earphone, and

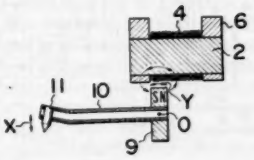
(ix) a switching means for interrupting the current flow between said current source and said amplifying means, said switching means consisting of a first switch contact mounted on said turn tube and a second switch contact mounted on said contactor body, said first and second contacts being positioned so as not to be in contact with each other when the turn tube is in a position of rotation with respect to the contactor body in which the communication holes of the turn tube coincide with the communication holes of the contactor body, said contacts being adapted to contact each other in another position of relative rotation in which the respective communication holes do not coincide.

4,072,823

MOVING MAGNET PICKUP

Tsugikuma Minamizono, Numazu, Japan, assignor to Kabushiki Kaisha Mitachi Onkyo Seisakusho, Japan

Filed May 28, 1976, Ser. No. 691,077
Claims priority, application Japan, June 6, 1975, 50-68415; Aug. 22, 1975, 50-101755; Apr. 12, 1976, 51-41076; Apr. 19, 1976, 51-44224
Int. Cl.² H04R 11/12
U.S. Cl. 179—100.41 M **5 Claims**



1. An electrodynamic type cartridge comprising

two longitudinally extending coiled bodies each comprised of a pillar-shaped frame or core made of magnetic permeable material and each would by coils along its longitudinal direction, the center axes of said two coiled bodies being positioned in parallel with each other;

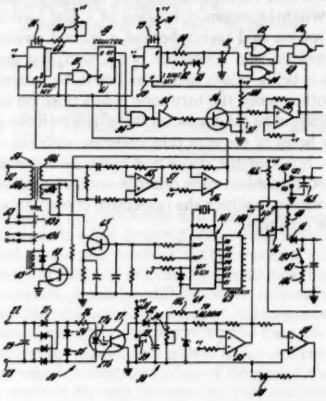
a magnet formed integrally with a stylus cantilever, the center axis of which is disposed in parallel with the axes of said two coiled bodies and on the plane dividing equally the distance between the axes of said two coiled bodies, said magnet positioned with respect to said two coiled bodied such that it respectively forms a complete magnetic circuit with each of said cores by utilizing only the respective cores for the major portion of its magnetic path,

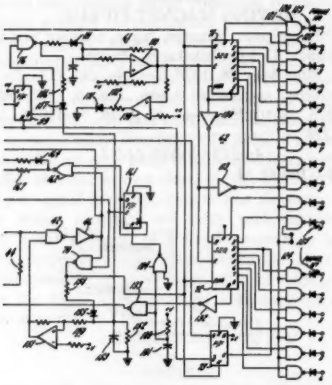
the coils of the two coiled bodies being wound through only a portion of its respective core, the magnet being adapted movably whereby the constant flux from the magnet directly cuts the respective coils in a direction substantially perpendicular thereto, and wherein said coils and magnet are cooperatively positioned whereby the induced output voltage from the coils have the same phase.

4,072,824
AUTOMATIC DIALER FOR PAGING SYSTEM OR THE LIKE

Robert C. Phillips, Chicago, Ill., assignor to Gimix, Inc., Chicago, Ill.

Filed Apr. 26, 1976, Ser. No. 680,200
Int. Cl.[2] H04M 3/42
U.S. Cl. 179—18 B 40 Claims





1. An automatic dialer for use with an automatic telephone answering machine and a central paging system, wherein the answering machine is connected to a telephone line for automatically answering calls and recording messages and the central system is of the type accessible by dialing a telephone number assigned thereto, the central system after answering a call placed thereto being adapted to accept dialed digits corresponding to the number assigned to a pager and to respond thereto by signaling that pager, said automatic dialer comprising in combination, means coupled to said telephone line for detecting the busy/idle status of the answering machine and producing an activating signal in response to a message left with said answering machine, calling cycle means responsive to said activating signal for performing a calling cycle comprising.

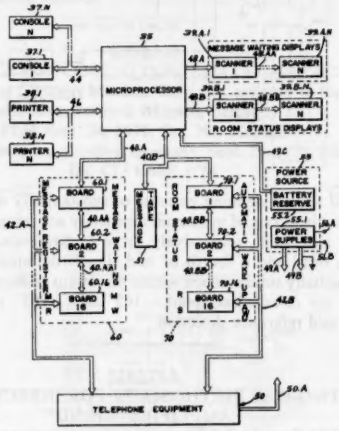
means for seizing a telephone line, means for detecting dial tone on said seized line, programmed telephone number dialing means initiated by said dial tone detecting means for dialing the number of said central system, means for sensing a responsive signal on said seized line indicating that the central system has answered, programmed pager number dialing means initiated by said responsive signal sensing means for dialing the number of said pager thereby to instruct the central system to signal the associated pager, and means for resetting

said calling cycle means after completion of a calling cycle, and reinitiating means for releasing said seized line and reinitiating a calling cycle if said calling cycle is aborted.

4,072,825
HOTEL/MOTEL AUTOMATIC CONTROL SYSTEM

Gerald M. McLay, St. Paul; Calvin D. Houdek, Lake Elmo, both of Minn., and Charles B. Yancey, Los Angeles, Calif., assignors to Mi-Tronics, Inc., St. Paul, Minn.

Filed June 30, 1976, Ser. No. 701,430
Int. Cl.[2] H04M 3/42; H04Q 3/54
U.S. Cl. 179—18 B 19 Claims



1. An automated monitoring and control system for establishments of the type having a plurality of occupant rooms each having at least one telephone set, an equipment bay for housing telephone control circuit means for the room telephone sets, and at least one pair of telephone signal conductors interconnecting each of the room telephone sets to the telephone control circuit means within the equipment bay, said control system comprising:

a. a plurality of feature circuit means operatively connected with the telephone control circuit means within the equipment bay for detecting the electrical status of a plurality of different occupant and room status related parameters, and for providing output control functions related to said parameters in response to received digital command signals; said plurality of feature circuit means comprising at least one electronically addressable feature circuit operatively identifiable with each of the occupant rooms and associated with said parameters thereof, wherein each said feature circuit is operatively connected for signal communication with the telephone set within that room with which it is identifiably associated;

b. microprocessor control means operatively connected to said plurality of feature circuits, and suitable for operative connection to one or a plurality of remotely located desk consoles, for automatically electronically monitoring and controlling in response to firmware program execution said plurality of occupant and room status parameters, on an individual room basis; said microprocessor control means being operable to sequentially and selectively electronically address individual ones of said feature circuits, to interrogate and process said electrical status conditions of said addressed feature circuits and to provide as a result of said processing, said digital command signals to said addressed feature circuits, said microprocessor control means comprising:

i. central processing means for performing, in response to firmware program instructions, arithmetic, logical and manipulative operations on and in response to digital information;

ii. firmware read only memory means operatively connected to said central processing means, for storing hardwired program instructions, and subroutines and routines comprising a plurality of said program instructions;

iii. random access memory means operatively connected with said central processing means for storing digital information under direction of said central processing means; and

iv. input/output circuit means connecting in circuit said processing means with said plurality of feature circuit means for operatively transmitting digital information including said detected electrical status signals and said digital command signals therebetween;

c. at least one personalized desk console means configured for manual activation by an operator for providing an input/output communication link between the operator and said microprocessor control means; said desk console means comprising a portable chassis member suitable for placement upon a desk surface, said chassis member including a plurality of push-button input selector switching means for generating encoded digital input signals for said microprocessor control means in response to manual activation stimuli, and electronic visual display means responsive to said digital command signals from said microprocessor control means for providing visual output indications of the real-time status of said plurality of parameters on an individual room basis; and

d. signal flow path means operatively connecting said personalized desk console means with said input/output circuit means of said microprocessor control means for transferring said encoded digital signals and said digital command signals therebetween.

4,072,826

PULSE STUFFING DEMAND GENERATING DEVICE

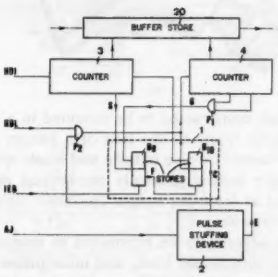
Andre' Auguste Aveneau, Clamart, France, assignor to Scholeman-Siemag Aktiengesellschaft, Germany

Filed Mar. 30, 1976, Ser. No. 671,822

Claims priority, application France, Apr. 18, 1975, 75 12178

Int. Cl.[2] H04J *3/06*

U.S. Cl. 179—15 AF **2 Claims**



1. A pulse stuffing demand generating device of the kind comprising means for comparing the phases of the write clock signals HDI and the read clock signals HDL of a buffer store in which are written and read multiplexed digital information, the said store having a capacity of *n* binary digits, wherein the said means comprise first means for comparing the phases of the rising edges of signals HDL and HDI, the said first means supplying a pulse stuffing demand signal when the rising edge of signal HDL is located in the "one" portion of the HDI signal, and second means for supplying a signal authorising the operation of the said first means, the said signal being supplied when one among *n* rising edges of the HDI signal is located in the "zero" portion of a signal resulting from the division by *n* of the HDL signal and the duration of which is equal to one binary digit time slot.

4,072,827

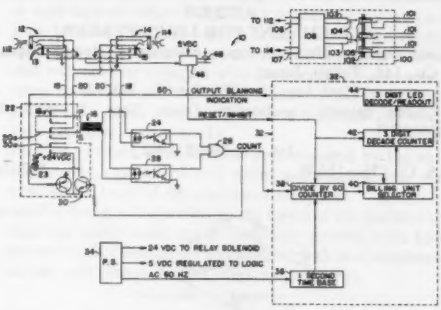
TELEPHONE PATCHING APPARATUS

Robert C. Oman, 120 Pierce St., #4, San Francisco, Calif. 94117

Continuation-in-part of Ser. No. 723,385, Sept. 15, 1976, abandoned. This application Feb. 3, 1977, Ser. No. 765,174

Int. Cl.[2] H04M *5/04*

U.S. Cl. 179—42 **8 Claims**



1. Apparatus for coupling external calls through a telephone switchboard comprising:

first and second signal lines;

jack means for connecting a phone plug to each of said signal lines;

transformer means for inductively coupling said first and second signal lines:

switching means in each of said signal lines for making and breaking the signal path through said lines;

call sensing means for independently detecting continuity in each of said signal lines and for providing a binary signal indicating, in a first state, the joint energization of said signal lines and, in a second state, the absence of energization of either of said signal lines; means for registering said joint energization after a preselected period provided by a delay means; and means for automatically activating said switching means to break said signal paths in response to said binary signal in said second state after said binary signal in said first state.

4,072,828

ROTATIVE WELDING GUN

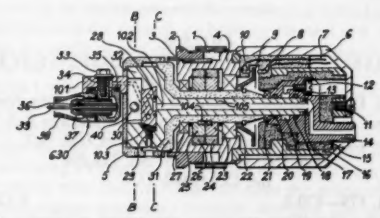
Paul Thome, Saint-Cloud, France, assignor to Mecazo, Feuquieres en Vimeu, France

Filed Dec. 10, 1976, Ser. No. 749,500

Claims priority, application France, Dec. 10, 1975, 75 37801

Int. Cl.[2] B23K *9/12*

U.S. Cl. 219—137.31 **11 Claims**



1. A rotative welding gun comprising:

a welding torch adjustably mounted on a movable block and rotatively mounted on a gun body;

a flat pancake motor with annular stator and rotor members for rotating said movable block with respect to said gun body;

a front portion of said movable block carrying said torch and being directly exposed outside said body so as to face a workpiece to be welded;

a rear portion of said movable block passing axially through said annular rotor member of said motor within said body, said rear portion being rigidly connected with said rotor member whereas said stator member of said motor is rigidly connected with said body.

4,072,829

ATTACHMENT FOR LOUDSPEAKER

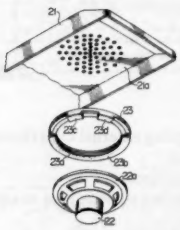
Kenzo Ogihara, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Aug. 30, 1976, Ser. No. 718,927

Claims priority, application Japan, Sept. 1, 1975, 50-120506[U]

Int. Cl.² H04R *1/02*

U.S. Cl. 179—146 R **4 Claims**



1. An attachment for a loudspeaker comprising a resilient mounting frame of a configuration conforming to the outer periphery of a loudspeaker and extending around an opening thereof, a groove formed in the inner circumferential surface of the frame for receiving the peripheral flange of the loudspeaker has a tight fit, and means for bonding the frame to a loudspeaker mounting surface;

the said frame is annular in configuration, the edge of the groove which is remote from the edge bonded to the mounting surface comprising a semi-circular edge portion and at least one sector-shaped edge portion spaced from the semi-circular portion and subtending an angle of the order of 10°.

2. An attachment for a loudspeaker comprising a resilient mounting frame of a configuration conforming to the outer periphery of a loudspeaker and extending around an opening thereof, a groove formed in the inner circumferential surface of the frame for receiving the peripheral flange of the loudspeaker has a tight fit, and means for bonding the frame to a loudspeaker surface;

the width of the said groove increasing with depth, with an edge of the groove which is remote from the edge being bonded to the mounting surface having an inclined inner surface.

4,072,830

VARIABLE PHASE SHIFTER FOR ADAPTIVE ECHO CANCELLERS

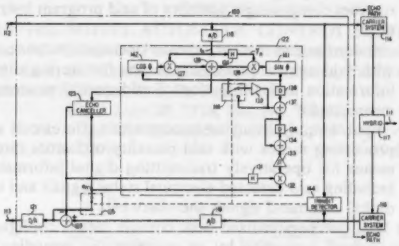
Richard Dennis Gitlin, Monmouth Beach, and John Stewart Thompson, Tintor Falls, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 4, 1976, Ser. No. 729,004

Int. Cl.² H04B *3/24*

U.S. Cl. 179—170.2 **9 Claims**

1. Echo cancelling apparatus comprising a variable phase shifter and an adaptive echo canceller connected in series and forming a shunt signal path across an echo path containing an echo signal which includes a time-varying phase shift, said shunt path producing an output signal formed by the serial signal processing of said phase shifter and said canceller, subtracting means for producing a residual echo as the difference between the output signal and the echo signal, said canceller



responsive to the residual echo by changing the output signal to reduce the residual echo, and said phase shifter responsive to the residual echo and the output signal for producing a time-varying phase shift in the output signal corresponding to the time-varying phase shift of the cho signal to minimize the residual echo signal.

4,072,831

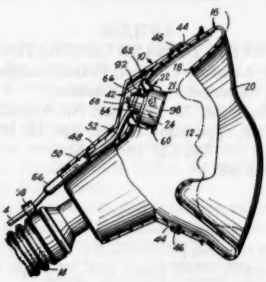
VOICE TRANSMITTING APPARATUS FOR A BREATHING MASK

Edwin Joscelyn, Commack, N.Y., assignor to Instrument Systems Corporation, Huntington, N.Y.

Filed Sept. 10, 1976, Ser. No. 722,251

Int. Cl.² H04R *1/08*

U.S. Cl. 179—188 **11 Claims**



1. An apparatus, constructed to be mounted in a breathing mask adapted to be worn on the face of a human being for transmitting the wearer's voice outside said mask, said breathing mask having a hollow generally cup-shaped mask body adapted to cover at least the mouth and nose region of the wearer's face, comprising:

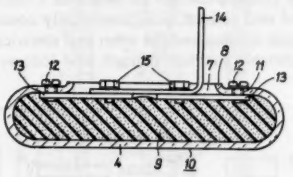
a microphone adapted to be connected in communication with a point outside said mask, said microphone having a diaphragm constructed and arranged to be set into vibration to generate an electrical signal; and

a protective sheath substantially encasing said microphone and including a thin, pliable wall in contact with said diaphragm, the wearer's voice being effective to set said wall into vibration so that said diaphragm is made to vibrate therewith, whereby an electrical signal representing the wearer's voice is generated by said microphone, said protective sheath being an integral pocket formed in said main body and extending into the interior of said mask, said pocket having an opening extending outside said main body.

4,072,832
CONTROL ELECTRODE FOR HIGH-VOLTAGE APPARATUS

Paul Küenzle, and Ulrich Baumgärtl, both of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 28, 1975, Ser. No. 608,756
Claims priority, application Germany, Sept. 3, 1974, 2442405
Int. Cl.[2] H01H 9/30, 33/02
U.S. Cl. 200—48 R 7 Claims

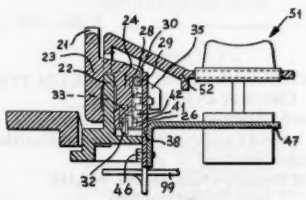


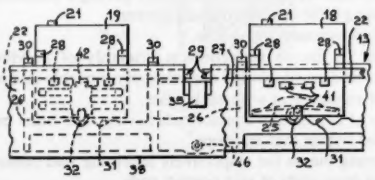
1. In a high-voltage switching apparatus wherein an electric field is present between parts of the switching apparatus separated by an insulating gas, the improvement comprising: a control electrode comprising: a body of conductive plastic foam material mounted so as to lie in said electric field, said body being formed to have a contour for reducing the intensity of said electric field.

4,072,833
KEYBOARD SELECTOR SWITCH ASSEMBLY FOR A CALCULATING MACHINE

Ugo Carena, Ivrea (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Apr. 22, 1976, Ser. No. 679,407
Claims priority, application Italy, May 2, 1975, 68114/75
Int. Cl.[2] H01H 9/00, 15/00
U.S. Cl. 200—5 R 1 Claim





1. A selector switch assembly for a keyboard of calculating, account and similar machines of the type having a frame mounting the keyboard and a cover, wherein the cover is provided with a first wall from which project the keys of the keyboard and a second wall substantially perpendicular to said first wall and comprising a plurality of aligned windows; the selector switch assembly comprising:

a plurality of sliders, each said slider comprising a pair of U-shaped arms, one of said pair of arms comprising first and second shoulder means;

a common support including a plurality of spaced coplanar guide walls for guiding the U-shaped arms of said sliders, a series of support walls, and transverse walls connecting said support walls with said guide walls for holding said guide walls displaced from said support walls along a plane parallel to said guide walls, said support walls having notches and hook members thereon;

a rod member fixedly mounted in the notches of said transverse walls and engaged with the first shoulder means of said sliders for holding said sliders in slidable engagement with said guide walls;

a printed circuit support plate engaged by the hook members of said support walls so that said printed circuit support plate bears against said support walls, said printed circuit support board bearing against said rod member to hold said rod member engaged with the notches of said transverse walls, said printed circuit support plate including a plurality of areas associated with said sliders and each including conductive tracks;

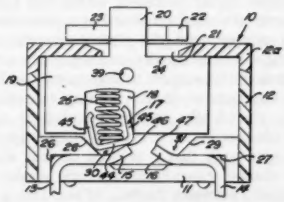
a plurality of conductive laminae each engaged by the second shoulder means of each slider and slidable over the conductive track of the associated area; and

means for fixing said assembly to the frame of the machine so that said guide walls are substantially parallel with said second wall of said cover and aligned with said windows, so that said sliders project from said windows.

4,072,834
ELECTRIC SLIDE SWITCH HAVING SLIDING CONTACT WITH CLEANING ACTION

Nelson Frederick John Godfrey, Studham, England, assignor to ERG Industrial Corporation Limited, England

Filed July 2, 1976, Ser. No. 702,151
Claims priority, application United Kingdom, Oct. 30, 1975, 45038/75
Int. Cl.[2] H01H 1/60, 15/02
U.S. Cl. 200—16 C 7 Claims



1. An electrical switch comprising a housing, at least first and second upstanding spaced-apart fixed terminals mounted in a wall of the housing, a slider disposed within the housing for movement along the direction joining the terminals and having a blind recess in a surface of the slider adjacent the terminals, a bridging element of U-shaped cross-section having a pair of arms joined by a curved bottom, the bridging element being disposed within the recess with its curved bottom projecting out of the recess towards the terminals, a helical spring disposed between the arms of the bridging element and acting between the inside of said curved bottom of the bridging element and the blind end of the recess to urge the curved bottom into contact with the terminals, the recess having a first wall which, when an operating force is applied to the slider, pushes the bridging element so that it slides over said first terminal, the recess also having a second wall facing said first wall of the recess and being so disposed as to permit the curved bottom to slip forwardly over said first terminal under the action of said spring and engage removably between said first and second terminals, the slider being movable a further amount up to a limiting position, and when the slider is so moved in operation

of the switch, said first wall of the recess pushes on the adjacent arm of the bridging element whereby the bridging element tilts forwardly through an angle, determined by the slope and disposition of said first wall, while the curved bottom remains in contact with and slides backwardly relative to said terminals resulting in a cleaning of the contact interfaces, and wherein said curved bottom of the bridging element constitutes a detent projection for removable engagement between said first and second terminals to provide a detent action for the switch.

4,072,835

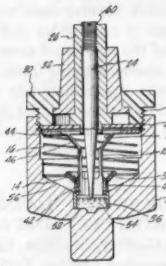
FLUID TYPE INERTIA SWITCH HAVING RESETTABLE PLUNGER AND CONE SHAPED RETAINER

Courtney L. Burke, Simi Valley, Calif., assignor to Albert M. Eisner, Los Angeles, Calif., a part interest

Filed July 6, 1976, Ser. No. 702,540

Int. Cl.[2] H01H *35/14, 29/20*

U.S. Cl. 200—61.47 **15 Claims**



1. A resettable switch comprising

a casing having a well in the base thereof,

a first slotted retainer maintained in a substantially press fit relation in said well and having a cone shaped lip extending above said well, a reservoir of high viscosity electrically conductive liquid contained within said first slotted retainer, a second slotted retainer having a lower tubular portion and an upper rim of a greater diameter than said tubular portion, an electrically insulating cap maintained in sealed relation with respect to said casing and having an electrically conductive plunger housing extending therethrough, an electrically conductive plunger supported within said plunger housing, an insulating washer affixed to said plunger such that a portion of said electrically conductive plunger extends through said washer, and

a spring positioned between the base of said casing and said second retainer so as to maintain said second retainer in a telescoped relation with respect to said first retainer to prevent the escape of said electrically conductive liquid from said retainer, whereby an electrically conductive path is formed between said casing and said plunger housing only when said electrically conductive liquid is in said well.

4,072,836

ELECTRICAL SWITCH WITH MEANS FOR SWITCHING AN AUXILIARY RESISTANCE INTO THE CIRCUIT CONTROLLED THEREBY

Walter Bischofberger, Zurich, and Gerhard Mauthe, Birmenstorf, both of Switzerland, assignors to BBC Brown, Boveri & Company Limited, Baden, Switzerland

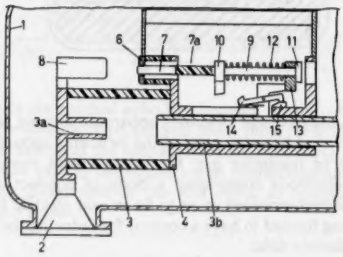
Filed Nov. 12, 1975, Ser. No. 631,215

Claims priority, application Switzerland, Nov. 22, 1974, 15552/74

Int. Cl.[2] H01H *33/16*

U.S. Cl. 200—144 AP **3 Claims**

1. In an electrical switch comprising a set of main contacts one of which is stationary and the other movable thereby to effect engagement and dis-engagement therebetween, the improvement which comprises a resistor and a set of auxiliary contacts for connection of said resistor between said set of main contacts prior to engagement therebetween during a switching-in operation and disconnection of said resistor not later than disengagement of said set of main contacts during a switching-out operation, one of said auxiliary contacts being electrically connected to said stationary main contact and the other of which is slidable relative to said movable main contact and insulatively coupled thereto by means of a follower device, one end of said resistor being electrically connected to said movable main contact and the other end electrically connected to said slidable auxiliary contact, said follower device



including a carrier member therefor secured to said movable main contact, a rod slidable in said carrier member, a latch member secured to said rod, a compression spring surrounding said rod between said latch member and said carrier member for actuating said rod, said rod including an electrically insulating section to which is joined said slidable auxiliary contact, and a latching lever on said carrier member cooperative with said latch member for engaging the latter when said spring has been compressed upon engagement between said set of a auxiliary contacts prior to engagement of said main contacts, said latching lever being dis-engaged from said latch member upon a return of said movable main contact to its dis-engaged position.

4,072,837

HIGH CONTINUOUS CURRENT VACUUM-TYPE CIRCUIT INTERRUPTER

Donald W. Crouch, Newtown Square, and Donald R. Kurtz, West Chester, both of Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed Dec. 29, 1975, Ser. No. 645,111

Int. Cl.[2] H01H *33/66*

U.S. Cl. 200—144 B **10 Claims**

1. In a vacuum-type circuit interrupter having a continuous current rating of several thousand amperes,

a. a highly evacuated envelope,

b. a pair of disc-shaped contacts primarily of beryllium within said envelope that are relatively movable into and out of engagement with each other,

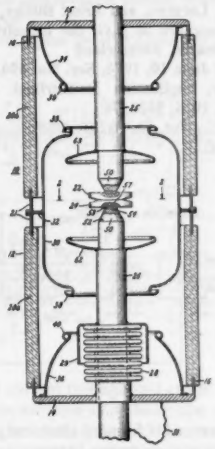
c. a pair of conductive contact rods having their inner ends located within said envelope,

d. mounting means for respectively mounting said contacts on the inner ends of said contact rods,

e. said mounting means for each contact comprising a backing member of truncated, generally-conical form, said backing member comprising (i) a base of a predetermined diameter attached to the inner end of an associated contact rod, (ii) an opposite end of relatively small diameter compared to that of said base attached to the associated disc-shaped contact in a location disposed generally centrally of said disc-shaped contact, and (iii) a body portion extending between said base and said opposite end,

f. each of said disc-shaped contacts projecting radially out-

ward past the outer periphery of said opposite end of the associated backing member,



g. the region immediately surrounding the outer periphery of said body portion of the backing member being substantially free of metal structure.

4,072,838

ELECTRICAL POWER SWITCH WITH PRESSURIZED GAS BLASTING DEVICE FOR LENGTHENING THE SWITCHING ARC

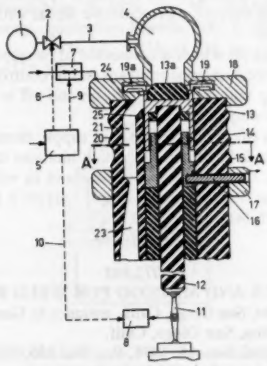
Lutz Niemeyer, Staretschwil, and Klaus Ragaller, Neuenhof, both of Switzerland, assignors to BBC Brown, Boveri & Company Limited, Baden, Switzerland

Filed Nov. 26, 1975, Ser. No. 635,351

Claims priority, application Switzerland, Dec. 10, 1974, 16358/74

Int. Cl.[2] H01H *33/54*

U.S. Cl. 200—148 R **4 Claims**



1. In an electric power switch which provides for lengthening of the circuit-breaking arc by blasting it with a pressurized gas the improvement characterized by the following features in combination:

a. the quenching gas is stored under very high pressure in an intermediate tank, its cubic capacity designed for at least one circuit-breaking operation,

b. travel rails for the arc feet are provided in an annular space, with the arc lengthening taking place at these rails under the influence of the flow of the pressurized gas,

c. a multitude of insulating nozzles are provided for the subsequent, additional arc lengthening,

d. the quenching gas serves simultaneously for the drive of the movable switch contact part.

4,072,839

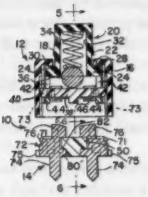
SLIDE SWITCH TYPE ASSEMBLY HAVING TWO PART HOUSING

Joseph J. Spedale, Chicago, Ill., assignor to Chicago Switch, Inc., Chicago, Ill.

Filed June 14, 1976, Ser. No. 695,936

Int. Cl.[2] H01H *9/00, 21/04*

U.S. Cl. 200—295 **14 Claims**



1. In a switch construction wherein opposed contacts are positioned on a base, a slider, and a bridging contactor in assembly with said slider, the slider assembly being mounted in an enclosure, the enclosure being adapted for attachment to the base for sliding movement of the slider assembly relative to the base and within the enclosure whereby the contactor shifts between a first position completing a circuit between the contacts and a second position whereat the contactor is out of engagement with at least one contact, and including a resilient means carried by the slider normally applying force to the contactor for pressing the contactor against the contacts on the base during switch operation, the improvement wherein said slider assembly includes means for holding the slider and contactor together whereby the assembly thereof remains intact when separated from the base, said holding means including ledge means defined by the slider, wings carried by said contactor, said resilient means in the assembly pressing the wings of the contactor against the ledge means when the assembly is separated from the base, and means projecting outwardly from said base for engaging the contactor when the assembly is connected to the base for thereby forcing the contactor wings out of engagement with the ledge means in opposition to said resilient means.

4,072,840

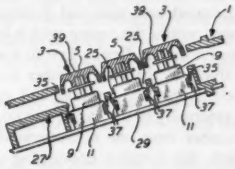
REMOVABLE KEYBOARD SWITCH

Phillip R. Daigle, Glenridge, N.J., assignor to Litton Business Systems, Inc., Morristown, N.J.

Division of Ser. No. 519,617, Oct. 31, 1974, abandoned. This application Sept. 19, 1975, Ser. No. 615,038

Int. Cl.[2] H01H *9/08*

U.S. Cl. 200—296 **5 Claims**



1. A keyboard assembly comprising:

a keyboard switch retainer including a first substantially flat plate having at least one aperture adapted for inserting a

keyboard switch therein, said aperture having a generally rectangular configuration and having two opposite walls which are substantially flat and at least two opposite portions of said other walls having angularly depending flexible tabs;

a keyboard switch adapted for being seated into said aperture, said switch having a housing assembly having four walls, two of said opposite walls being substantially flat and the other two walls having relieved openings therein;

said tabs being deformed to a first position by the edges of said walls having relieved openings therein during seating of said keyboard switch thereby permitting said keyboard switch to be seated into said aperture;

said tabs being received by said relieved openings and assuming a second position once said keyboard switch has been seated thereby retaining said keyboard switch in a seated position;

said keyboard switch being removable through said aperture by moving said tabs away from said relieved openings thereby freeing said keyboard switch from its seated position;

said tabs being movable away from said relieved openings by the insertion of a member through said aperture to deform said tabs to said first position.

4,072,841

ELECTRICAL SWITCHES

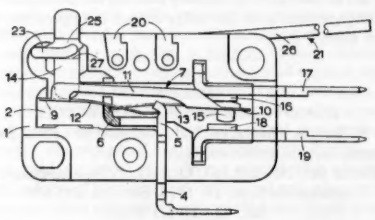
John Courtney Corfield, Waltham St. Lawrence, England, assignor to Unimax Switch Limited, Maidenhead, England

Filed Sept. 29, 1976, Ser. No. 727,851

Claims priority, application United Kingdom, Oct. 1, 1975, 40110/75

Int. Cl.² H01H *3/04*

U.S. Cl. 200—332 **12 Claims**



1. A snap-action switch comprising a casing, a slide member which is movable longitudinally of itself in the switch casing between non-operated and operated positions, an electrical switching element within the casing which is engaged by the slide member and is moved from a first to a second switching position respectively as the slide member is moved from the non-operated to the operated position, and a pivoted actuator which extends externally of the casing and controls movement of the slide member from the non-operated position to the operated position, the actuator comprising a length of wire which is pivoted in a hole in the switch casing and which has a bent end portion within the casing which is connected to the slide member so that pivoting of the actuator in one particular sense causes the slide member to move from the non-operated to the operated position.

4,072,842

ELECTRO-EROSION MACHINE TOOL AND A PULSE GENERATOR FOR USE IN SUCH A MACHINE TOOL

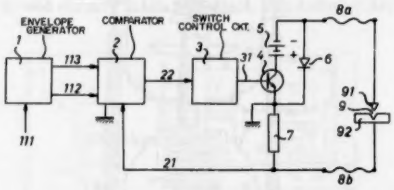
Werner Ullmann, Locarno, and Ernst Bühler, Tenero, both of Switzerland, assignors to A.G. fur industrielle Elektronik, Losone near Locarno, Switzerland

Filed June 10, 1976, Ser. No. 694,569

Claims priority, application Switzerland, June 17, 1975, 7855/75; Apr. 29, 1976, 5420/76

Int. Cl.² B23P *1/08*

U.S. Cl. 219—69 C **17 Claims**



1. A pulse generator for forming electrical pulses which are to be passed across a working gap between a workpiece and a tool electrode in an electro-erosion machine tool so as to machine the workpiece by eroding it, the pulse generator comprising:

envelope signal forming means (1) for forming respective signals having waveforms which define an upper and lower envelope curve (16 and 17) having shapes corresponding to the envelope shape of the pulse to be generated;

current supply means for supplying electrical current to said working gap, the supply means including a switch (4) for turning the supply current on and off;

gap current representative signal forming means (7) for forming a signal representative of the gap current passing across said gap;

comparing means (2) which is connected to said envelope signal forming means (1) and said gap current representative signal forming means (7) and is operable for comparing the gap current representative signal with each envelope signal;

control means (3) which is connected to be responsive to the output of the comparator means and to control said switch for turning said supply current on and off in dependence upon the comparison; and

diode means (6) connected to said supply means to form a circuit (via 6, 7, 8*a* and 8*b*) which includes the said work gap when the generator is in use and in which residual current can flow when said supply current is turned off by said switch (4).

4,072,843

APPARATUS AND METHOD FOR WELD BONDING

Robert L. Szabo, San Diego, Calif., assignor to General Dynamics Corporation, San Diego, Calif.

Filed June 16, 1976, Ser. No. 696,603

Int. Cl.² B23K *11/10*

U.S. Cl. 219—91.21 **7 Claims**

7. Method of welding together a pair of conductors separated by a thermo-plastic insulation material comprising the steps of:

applying a first pre-selected level of pressure to said pair of conductors positioned between a pair of electrodes;

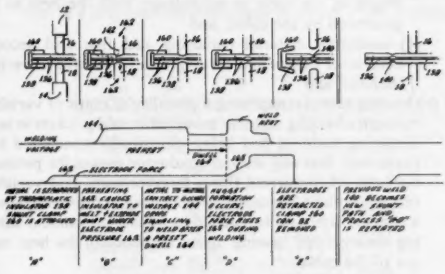
passing a first level of current through said electrodes and said pair of conductors;

sensing electrical contact through said thermo-plastic insulation and said pair of conductors between said pair of electrodes;

maintaining said first level of current for a pre-selected length of time after sensing said electrical contact;

terminating said first level on current after said pre-selected length of time;

passing a second higher level of current at the termination of



first level of current through said electrodes and said pair of conductors between said electrodes; and

increasing progressively from said first pre-selected level of pressure to a second pre-selected higher level of pre-selected pressure during at least a portion of the flow of said second higher level of current.

4,072,844

APPARATUS FOR ELECTRON BEAM MACHINING IN VACUUM

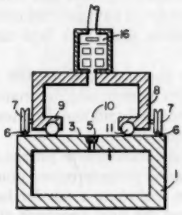
Georges Sayegh, Montrouge, France, assignor to Sciaky Bros., Inc., Chicago, Ill.

Filed June 28, 1976, Ser. No. 700,090

Claims priority, application France, Feb. 7, 1976, 75 20838

Int. Cl.[2] B23K *15/00*

U.S. Cl. 219—121 EB **7 Claims**



1. A vacuum machining facility incorporating a first large chamber including a longitudinal gap having a V-shaped cross section which determines a leakproof area around the machining line of the parts to be machined; a flexible strip to plug this gap; a second leakproof chamber which houses a machining tool, this second chamber including an orifice located close to the gap; sealing systems located around the orifice between both chambers, a drive unit to move the said second chamber on the first chamber and along the gap; a system designed to move the plugging strip away from the gap close to the orifice, this arrangement being featured by the fact that the strip is fully housed inside the gap, its upper face being level with the outer face of the first chamber.

4,072,845

WELDING ELECTRODE

Herbert Charles Buckingham, St. Albans, and Raymond Elliott, Boreham Wood, both of England, assignors to BOC Limited, London, England

Filed July 28, 1975, Ser. No. 599,584

Int. Cl.[2] B23K *35/00*

U.S. Cl. 219—146.3 **13 Claims**

1. In an electrode for gas-shielded electric open-arc welding and hard facing wherein an electrode is in the form of a flux-cored wire having a tubular casing of which the main constituent is iron and which casing contains dry core material comprising an intimate mixture of powdered metal, deoxidant and flux forming agent, the improvement comprising providing an improved metal deposition rate by provision of an electrode containing by weight of the total electrode:

about 0.08 to about 1.2% of the flux-forming agent;

about 1 to about 5.25% of deoxidant;

the weight of the core being about 24 to about 35% of the total weight of the electrode, the balance being provided by the tubular casing; and

the core being about at least 80% iron powder by weight.

4,072,846

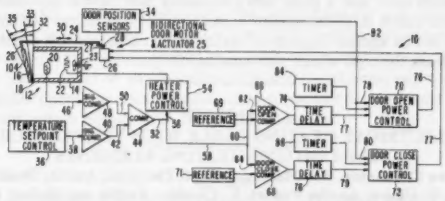
CONTROL SYSTEM FOR A CHROMATOGRAPHY APPARATUS OVEN DOOR

Urs Christen, Walnut Creek, and Dewayne C. Guidinger, Concord, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed Mar. 1, 1976, Ser. No. 662,769

Int. Cl.[2] H05B *1/02*

U.S. Cl. 219—497 **7 Claims**



1. In a chromatography apparatus of the type including an oven for a chromatography column and electric heater means for controllably heating said oven, an improved system for controllably opening and closing the door of said oven to enable stabilization of the temperature in said oven at a desired set point, said system comprising:

means for generating an electrical signal that indicates by first or second conditions, respectively, whether the oven temperature is above or below said set point;

heater power control means for receiving said oven temperature indicative signal, said heater power control means being enabled by said first temperature indicative signal condition to effect heating of said oven and being inactive in response to said second temperature indicative signal condition;

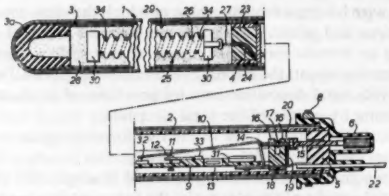
bi-directional motor and actuator means for opening and closing said oven door over a prescribed operating range; and

means for enabling said motor and actuator means to operate for a predetermined actuation period when said temperature indicative signal in either said first or second condition departs from a preset threshold value for each condition for a predetermined time interval, whereby to effect opening or closing of said door in incremental steps.

4,072,847
ELECTRICAL HEATER FOR HEATING LIQUID

John Leslie Craven, Leigh-on-Sea, England, assignor to Liquifry Company Limited, England

Filed Dec. 16, 1976, Ser. No. 751,339
Claims priority, application United Kingdom, Dec. 16, 1975, 51509/75
Int. Cl.[2] H05B 3/80; H01C 1/02
U.S. Cl. 219—523 7 Claims

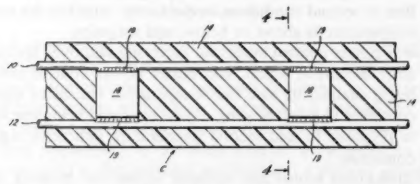


1. An electrical heater for heating a liquid, the heater comprising: a pair of conductors for applying electrical energy to the heater; an electrical heating element coupled across said conductors; a temperature-sensitive device coupled between said heating element and one of said conductors for feeding of current to said heating element to control the operating temperature of said element as a function of ambient temperature; a tubular enclosure sealed against ingress of water and formed by a metal tube closed against ingress of water at one end, an electrically insulative plastics tube joined at one of its ends in water-tight manner to the other end of said metal tube, and a sealing plug through which said conductors extend and which seals the other of the ends of said plastics tube, said heating element being within said metal tube and said temperature-sensitive device being within said plastics tube; electrical insulating means electrically insulating said heating element from said metal tube; and a glass tube containing said tubular enclosure and which is closed against ingress of moisture at one end and is sealed against ingress of water at its other end by sealing means through which said conductors pass.

4,072,848
ELECTRICAL HEATING CABLE WITH TEMPERATURE SELF-LIMITING HEATING ELEMENTS

Ben C. Johnson, San Marcos; J. Scott Thornton, Austin; Donald E. Glowe, Austin; Patrick E. Cassidy, Austin, and Robert E. Anderson, San Marcos, all of Tex., assignors to Thermon Manufacturing Company

Continuation-in-part of Ser. No. 707,648, July 22, 1976. This application Aug. 16, 1976, Ser. No. 714,574
Int. Cl.[2] H05B 3/56
U.S. Cl. 219—528 6 Claims

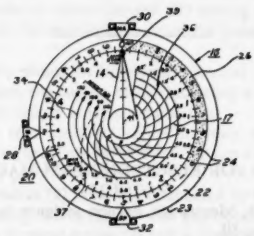


1. A temperature self-limiting electrical heating cable or tape to provide heat to pipes, tanks and the like, comprising:
(a) first conductor means and second conductor means extending in proximity to each other along the length of the cable for conveying electrical current;
(b) insulating means, comprising:
(1) insulating material mounted between said first and second conductor means along the length of the cable for insulating said first and second conductor means from each other;
(2) said insulating material mounted between said first and second conductor means having portions thereof removed at spaced intervals thereof to form pockets;
(3) said pockets being spaced from each other along the length of the cable in accordance with the heat to be generated by the cable; and
(4) insulating material enclosing said first and second conductor means and serving as a protective covering therefor; and
(c) heating means comprising a plurality of chips of variable resistance heating material mounted in said pockets in said insulating material and being electrically connected between said first and second conductor means for producing heat when current flows therethrough, said variable resistance chips substantially increasing in resistance when a temperature limit is reached to reduce the current flowing through said heating means and control the heat output of the cable.

4,072,849
APPARATUS AND METHOD FOR CALCULATING VEHICLE MOVEMENT PARAMETERS

William J. Camp, 14 B Glendale Manor, Pleasantville, N.J. 08232

Filed Aug. 13, 1971, Ser. No. 171,456
Int. Cl.[2] G06K 1/00
U.S. Cl. 235—61 NV 15 Claims



1. An aircraft navigational computing apparatus comprising:
a. means for indicating time during a specified time interval, said means including a powered rotary pointer,
b. a clock face mounted adjacent said time indicating means and having a first set of navigational indicia including time and distance indicia, said clock face means being stationary,
c. annular means mounted toward the periphery of said clock face means which may be manually rotated to a predetermined setting, said annular means having altitude indicia formed thereon, and
d. a plurality of tabs mounted in proximity to said annular means for indicating predetermined points thereupon, said plurality of tabs including a tab for indicating the minimum altitude and the final approach altitude.

4,072,850
VEHICLE USAGE MONITORING AND RECORDING SYSTEM

Daniel R. McGlynn, 329-84th St., Brooklyn, N.Y. 11209

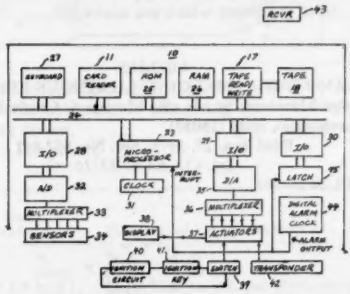
Continuation-in-part of Ser. No. 538,356, Jan. 3, 1975, Pat. No. 4,013,875, which is a continuation-in-part of Ser. No. 432,691, Jan. 11, 1974, abandoned. This application Sept. 10, 1975, Ser. No. 612,195
Int. Cl.[2] B60K 26/00; G08B 21/00
U.S. Cl. 364—424 20 Claims

1. A digital control system for use in a vehicle for selecting one of a plurality of operational modes at a perdetermined time, comprising

means in said vehicle for selecting an operational mode of said vehicle, having an input for designating a predetermined one of said modes;

means for activating operation of said vehicle in said selected one mode, having an input for initiating activation thereof;

a digital alarm clock in said vehicle for storing a representation of a first predetermined time at which a first predetermined one of said operational modes should be activated, having an input for resetting said stored time, and having an output connected to said input of said activating means for supplying a signal when said first predetermined time occurs; and



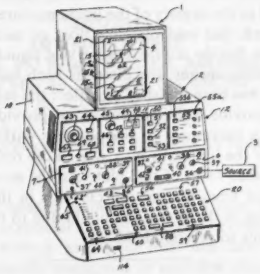
means connected to said input of said digital alarm clock for automatically resetting said digital alarm clock to a representation of second predetermined time in response to said output signal of said clock.

4,072,851

WAVEFORM MEASURING INSTRUMENT WITH RESIDENT PROGRAMMED PROCESSOR FOR CONTROLLED WAVEFORM DISPLAY AND WAVEFORM DATA REDUCTION AND CALCULATION

Frederick A. Rose, Fort Atkinson, Wis., assignor to Norland Corporation, Fort Atkinson, Wis.

Filed Mar. 26, 1976, Ser. No. 670,703
Int. Cl.[2] H01J *29/70*; G01R *23/16*
U.S. Cl. 364—487 **65 Claims**



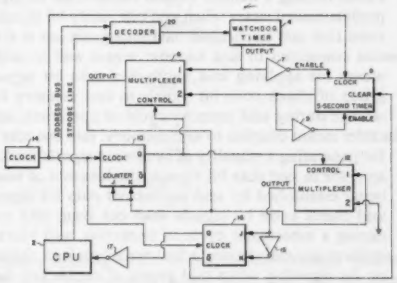
1. A waveform measuring and analyzing instrument having a visual display means comprising digitized memory array means for storage of the coordinates for the visual display means in digitized form, a data acquisition means connected to said memory means for establishing a digitized representation of a waveform, a programmed processor having a program memory, and an interactive user operated control means having a plurality of keystroke means for each of a plurality of basic arithmetic functions of addition, subtraction, multiplication and division and for each of a plurality of compound mathematical functions for reduction and calculation involving the waveform data signals in the memory array means, said program memory including programs for each of said keystroke means, and said processor including means responsive to actuation of said keystroke means to invoke the corresponding program.

4,072,852

DIGITAL COMPUTER MONITORING AND RESTART CIRCUIT

James A. Hogan, Hatfield, and Morton Sklaroff, Fort Washington, both of Pa., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 23, 1976, Ser. No. 716,709
Int. Cl.[2] G06F *11/04*
U.S. Cl. 235—303.1 **6 Claims**



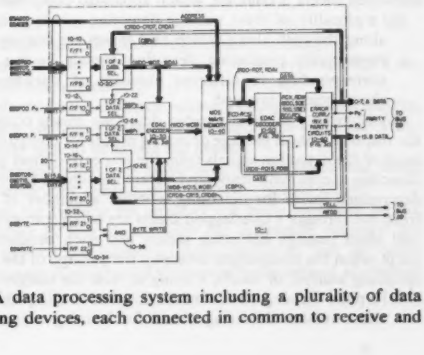
1. A method of monitoring the operation of a digital computer comprising the steps of detecting the presence of periodic output signals from the digital computer generated in response to a computer program, generating a restart signal if a predetermined number of said output signals is missing, applying the restart signal to the digital computer to restart the operation thereof, concurrently starting a predetermined time interval measurement to generate a control signal at the end of said time interval, detecting the presence of said output signals from the computer following the application of said restart signal to the digital computer and interrupting said measurement of said time interval to inhibit the generation of said control signal as an indication of a continued improper computer operation upon the detection of further missing ones of said output signals from the digital computer.

4,072,853

APPARATUS AND METHOD FOR STORING PARITY ENCODED DATA FROM A PLURALITY OF INPUT/OUTPUT SOURCES

George J. Barlow, Tewksbury, and Chester M. Nibby, Jr., Peabody, both of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Sept. 29, 1976, Ser. No. 727,821
Int. Cl.[2] G11C *29/00*; G06F *11/12*
U.S. Cl. 235—312 **27 Claims**



1. A data processing system including a plurality of data handling devices, each connected in common to receive and

transfer groups of signals over a bus network, said system further including a memory subsystem comprising:

a memory for storing said groups of signals;

input means coupled to said bus for receiving said groups of signals from any one of said data handling devices for storage in said memory during a memory cycle of operation, each said group of signals including a plurality of unchecked data bit signals and at least one parity bit signal for indicating the validity of said data bit signals;

encoder means coupled to said input means and to said memory, said encoder means for generating a group of check code bits derived from a group of said unchecked data bit signals and said one parity bit signal, said encoder means forcing a number of said check code bit signals to predetermined states when said one parity bit signal designates that said unchecked data bit signals are in error;

means connected to said encoder means and to said input means for applying said unchecked data bit signals and group of check code bit signals to said memory for said storage during said memory cycle of operation; and,

decoder means coupled to said memory, said decoder means for generating a plurality of syndrome signals for locating an error in said data bit signals, the location of said error being established by said unchecked data bit signals and said check code bit signals read out from said memory during a subsequent cycle of operation, said plurality of syndrome signals having a first predetermined characteristic for signaling when said group of unchecked data signals from any one of said data handling devices have incorrect parity when written into said memory enabling the storage of said signals from said bus to proceed without decreasing the operating speed of said system.

4,072,854

SHEET COUNTING APPARATUS

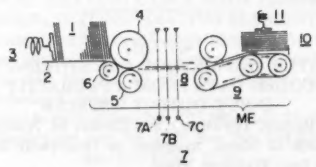
Takeo Oshima, and Takashi Kondō, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Hyogo, Japan

Filed July 6, 1976, Ser. No. 703,116

Claims priority, application Japan, July 30, 1975, 50-92941; Aug. 1, 1975, 50-93772; Aug. 5, 1975, 50-94742

Int. Cl.² G06M *7/06*

U.S. Cl. 235—92 SB **2 Claims**



1. A sheet counting apparatus wherein sheets loaded therein are successively separated and conveyed and the number of conveyed sheets is counted, which apparatus comprises:

(a) a plurality of sheet passage detecting means positioned along the path along which said sheets are conveyed for respectively producing detecting signals having levels corresponding to different numbers of thicknesses of sheets being conveyed;

(b) a plurality of sheet number detecting means coupled to the respective sheet passage detecting means for comparing the level of the detection signals from the respective sheet passage detecting means with respective reference signals having predetermined levels for detecting whether a number of sheets from one through *n* overlapped sheets are being conveyed past said sheet passage detecting means and each producing an outpt when the comparison indicates the passage of the corresponding number of sheets, *n* being at least the integer 2;

(c) a pulse forming circuit means coupled to said plurality of sheet number detecting means for forming a number of pulses equal to the number of outputs from said sheet detecting means; and

(d) pulse counting means coupled to said pulse forming circuit means for counting the number of pulses from said pulse forming means,

whereby even when the sheets are overlapped when they are being conveyed, pulses are formed corresponding to the number of the overlapped sheets to correctly count all of the sheets which are conveyed.

4,072,855

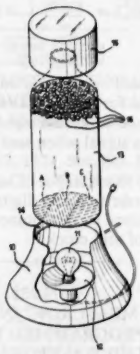
LAMP WITH CHANGING LUMINOUS EFFECTS

Ludovico Marchese, Strada alla Morana 6, Casale Monferrato (Alessandria), Italy (15033)

Filed Jan. 27, 1976, Ser. No. 652,811

Int. Cl.² A47G *33/16*

U.S. Cl. 362—101 **16 Claims**



1. A lamp with changing luminous effects comprising means to provide heat and light and a transparent container located adjacent said means to provide heat and light; said container being filled with a mixture of liquids, the density of the liquid mixture varying with the temperature of said means to provide heat, the liquid mixture having metallized platelets dispersed therein which have a thickness which, related to the surface thereof and to the density of the liquid mixture at room temperature, is such that said platelets float on said liquid at room temperature, but do not float when said liquid has been heated by said heating means; the platelets each having at least one face which has been polished to reflect the rays emitted by the means to provide light; the means to provide heat and light generating a movement of the platelets within the liquid and sparkling of the luminous rays, due to the reflection produced by the polished faces of said platelets, the motion of the platelets resulting from convection currents in the liquid mixture and variation in density in the liquid due to the heating effect of said means to provide heat.

4,072,856

DAYLIGHT-SIMULATING INCANDESCENT LAMP LIGHT FIXTURE, PARTICULARLY FOR MEDICAL AND DENTAL USE

Hans Eligehausen, Hanau am Main, Germany, assignor to W. C. Heraeus GmbH, Hanau am Main, Germany

Filed Jan. 25, 1977, Ser. No. 762,415

Claims priority, application Germany, Feb. 9, 1976, 2604921

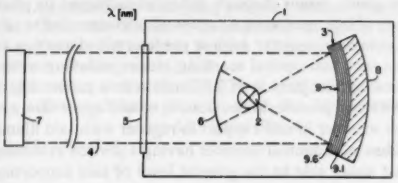
Int. Cl.² F21M *7/00*

U.S. Cl. 362—2 **13 Claims**

1. Reflector structure to provide reflected light matching at least approximately daylight when illuminated by a source of radiation having a color temperature of about 3000° K, comprising

a substrate carrier (8) of a material highly pervious to infra-

red radiation and having an index of refraction n_d of between about 1.425 to 1.575;



and a series of layers (9.1 - 9.6) applied to at least one side of said carrier substrate, in increasing distance from said substrate carrier,

said layers comprising

Layer No.	Index of Refraction	Thickness of Layer	Material
	n_d	A	
9.1	about 1.9 to/2.1	about 1020 to/1120	tantalum, niobium or zirconium oxide
9.2	about 1.4 to/1.5	about 665 to/735	silicon dioxide or magnesium fluoride
9.3	about 2.4 to/2.6	about 400 to/440	zinc sulfide or titanium oxide
9.4	about 1.4 to/1.5	about 665 to/735	silicon dioxide or magnesium fluoride
9.5	about 2.4 to/2.6	about 400 to/440	titanium oxide or zinc sulfide
9.6	about 1.4 to/1.6	about 1050 to/1155	silicon dioxide or magnesium fluoride

4,072,857
ARTIFICIAL TREE

Guy A. DeVicaris, 957 Bristol Pike, A-6, Andalusia, Pa. 19020

Filed May 10, 1976, Ser. No. 684,753
Int. Cl.[2] F21S 1/12
U.S. Cl. 362—123 21 Claims

1. An artificial tree capable of conducting an electric current comprising:

base means;

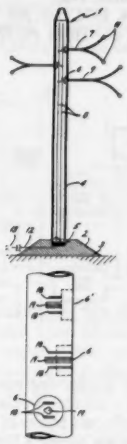
artificial trunk means connected to said base means and having first electrical conductor means extending therewithin and further having at least one first connector means electrically connected to said first electrical conductor means, said first connector means extending through an outside wall of said trunk means; and

at least one artificial limb means having second electrical conductor means extending therewithin and second connector means electrically connected to said second electrical conductor means;

wherein said first connector means is a first female-type electrical connector comprising first narrow slit means, wherein said second connector means is a first male-type electrical connector comprising first narrow prong means corresponding in shape to said slit means such that said limb means can be detachably and electrically connected to said trunk means,

wherein one of said first female-type electric connector and said first male-type electric connector is provided with first auxiliary structural support means, and

wherein the other of said connectors is provided with first

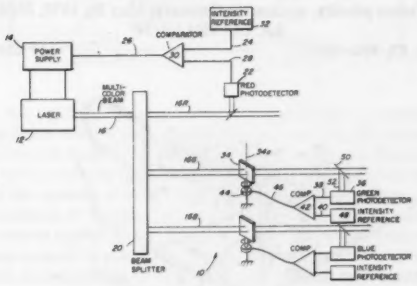


auxiliary opening means corresponding in shape with said first structural support means such that said structural support means can be inserted into said first opening means in use.

4,072,858
LASER BEAM INTENSITY REGULATOR

Samuel M. Stone, Lynnfield, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed July 26, 1976, Ser. No. 708,652
Int. Cl.[2] G01J 1/32
U.S. Cl. 250—205 9 Claims



1. A laser beam intensity regulator comprising:

means for generating a reference signal representing a desired beam intensity;

a dielectric coated mirror having a passband whose sloping edge includes the beam bandwidth and mounted in the beam path to attenuate the beam;

photodetecting means responsive to the attenuated beam intensity for generating an intensity-related signal;

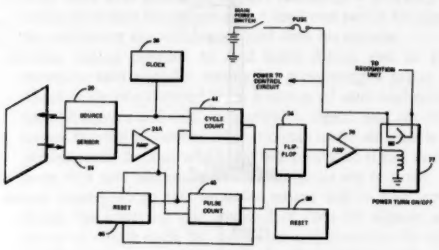
means for varying the angle of the beam incidence on the mirror in accordance with the difference between the reference and intensity-related signals so that the beam intensity is maintained at essentially the desired attenuated level.

4,072,859

WAND TURN-ON CONTROL

Lynn D. McWaters, Irving, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.

Filed Oct. 4, 1976, Ser. No. 729,531
Int. Cl.[2] H01J *39/12*
U.S. Cl. 250—214 R **11 Claims**



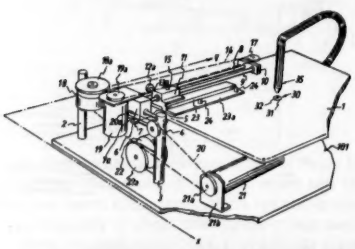
7. A control circuit for conserving power in a battery powered system comprising: a source of pulsed radiated energy, a detector for receiving reflected pulses of said radiated energy, a clock circuit for producing pulses, a first counting circuit for receiving and counting clock pulses, a second counting circuit for receiving and counting said received reflected pulses, said first and second counting circuits each programmed to count down from a different predetermined number, a reset circuit for resetting both said counters when said first counter counts down before said second counter counts down, and a power control circuit triggered by said second count circuit when said second counting circuit counts down before said first counting circuit.

4,072,860

APPARATUS FOR OPTICAL SCANNING OF MICROFILMS OR THE LIKE

Boris Koleff, Munich, and Wilfried Hofmann, Taufkirchen, both of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed May 10, 1976, Ser. No. 685,088
Claims priority, application Germany, May 30, 1975, 2524154
Int. Cl.[2] H01J *3/14*
U.S. Cl. 250—216 **19 Claims**



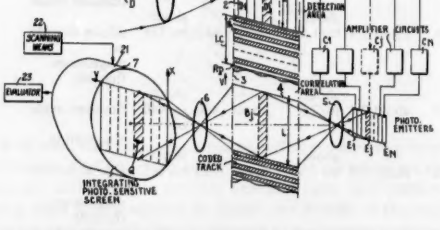
1. Apparatus for optically scanning flexible sheet-like light-transmitting carriers of information, particularly microfilms or test films, comprising a support having a substantially horizontal upper side; first elongated quide means provided on said support; a first carriage movable along said guide means; second elongated quide means provided on said first carriage; a second carriage movable along said second guide means, said first and second guide means being at least substantially parallel to said upper side; coupling means provided on said second carriage and including a supporting surface for a portion only of the margin of a carrier of information and means for separably retaining such portion of the margin in contact with said surface, said surface being parallel with and closely adjacent to said upper side; means for moving said carriage along the respective guide means through distances sufficient to place any portion of information on a carrier which is coupled to said second carriage in register with a predetermined portion of said upper side; and optical scanning means including means for illuminating that portion of information on a carrier which register with said predetermined portion of said upper side, and an annular member in said support in register with said illuminating means, said annular member having a portion extending above said upper side to the general level of said supporting surface to provide a rest for a carrier which is coupled to said second carriage.

4,072,861

OPTICAL TRACKING SYSTEM

Georges Couderc; Claude Andre Payen; Jean Dansac, and Leonidas Symaniec, all of Paris, France, assignors to Thomson-CSF, Paris, France

Continuation-in-part of Ser. No. 203,186, Nov. 30, 1971, abandoned. This application Oct. 18, 1973, Ser. No. 407,443
Claims priority, application France, Dec. 4, 1970, 70.43739
Int. Cl.[2] G01D *5/36;* G06F *15/34;* G06G *7/19*
U.S. Cl. 250—233 **7 Claims**



1. An optical tracking system comprising:

an optical objective having an axis centered on a field of view;

a code carrier partly located in a detection area substantially in a focal plane of said objective;

drive means for continuously moving said code carrier in a direction transverse to said axis, said code carrier being subdivided into a multiplicity of juxtaposed strip zones parallel to its direction of motion, each strip zone forming a pseudo-random binary optical code pattern and at least one replica thereof following one another in said direction, the code patterns of said strip zones being longitudinally coextensive, whereby continuous luminous radiation from a distant target within said field of view is converted into a pulsed light beam, the combined width of said strip zones equaling the width of said detection area transverse to said direction;

conversion means transforming said pulsed light beam into a train of luminous pulsations in the rhythm of the beam pulses;

projection means directing said pulsations onto said code carrier in a correlation area of said code carrier having the same dimensions as said detection area, the centers of said detection area and said correlation area being separated in said direction by a whole number of lengths of said code patterns whereby said areas are traversed by correlated optical patterns at each instant; and

focusing means for projecting light from said correlation area onto a receiving surface.

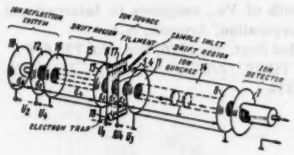
4,072,862
TIME-OF-FLIGHT MASS SPECTROMETER

Boris Alexandrovich Mamyrin, prospekt Toreza, 9, kv. 89; Valery Ivanovich Karataev, Grazndansky prospekt, 70, kv. 36, and Dmitry Viktorovich Shmikk, Olginskaya ulitsa, 12, kv. 27, all ofLeningrad, U.S.S.R.

Continuation of Ser. No. 598,026, July 22, 1975, abandoned. This application June 14, 1976, Ser. No. 695,409

Int. Cl.[2] H01J *39/34*

U.S. Cl. 250—286 **17 Claims**



1. A time-of-flight mass spectrometer, comprising: a vacuum analyzer chamber having an axis; means to maintain vacuum in said chamber; a pulsed ion source in said analyzer chamber; electrodes of said pulsed ion source which are transparent to the ions studied; an ion detector disposed in coaxial relationship with said ion source in said analyzer chamber; a drift space in said analyzer chamber disposed between said ion source and said ion detector; an ion reflecting system disposed in said analyzer chamber in coaxial relationship with said ion source on the side thereof facing away from said ion detector and a gap defined in said analyzer chamber between said reflecting system and said ion source.

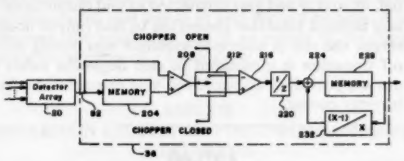
4,072,863
PYROELECTRIC INFRARED DETECTION SYSTEM

Carlos B. Roundy, 1379 Juniper Drive, Logan, Utah 84321

Filed Oct. 26, 1976, Ser. No. 735,457

Int. Cl.[2] H01J *31/50*

U.S. Cl. 250—332 **9 Claims**



9. A pyroelectric infrared detection system comprising

a pyroelectric detector array having a plurality of individual detector elements spaced apart at a distance of from 0.5 millimeters to 25 microns, each detector element adapted to detect infrared radiation applied to the array and to produce signals representative of detected radiation,

means for successively interrupting the application of radiation to the array at a rate of from 30 to 1000 Hertz,

output conductor means, and

means for applying the signals produced by the detector array to the output conductor means.

4,072,864
MULTILAYERED SLANT-ANGLE THIN FILM ENERGY DETECTOR

Robert Jacob von Gutfeld, New York, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,695

Int. Cl.[2] G01J *1/00*

U.S. Cl. 250—338 **19 Claims**

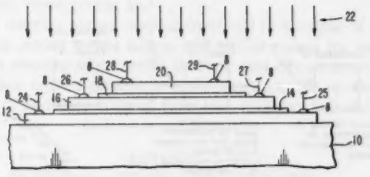
1. A detector of electromagnetic waves comprising:

a substrate, of at least average thermal conductivity dielectric material

a first thin film deposit of electrically and thermally conductive material having an induced anisotropy,

a second thin film deposit of an electrically insulating, thermally conductive material,

a third thin film deposit of electrically and thermally conductive material having an induced anisotropy,



each of said first and third thin film deposits being connected electrically to at least a pair of contacts for developing an electrical signal between said contacts, and means for establishing a temperature gradient in said deposits in a direction normal to the planes of the surfaces of said deposits.

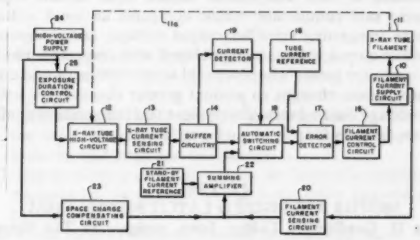
4,072,865
AUTOMATIC CONTROL SYSTEM

James R. Craig, Glenview, and Steven F. Nerge, Elgin, both of Ill., assignors to American Radiologic Systems, Inc., Melrose Park, Ill.

Filed June 24, 1976, Ser. No. 699,444

Int. Cl.[2] H05G *1/34, 1/58*

U.S. Cl. 250—409 **9 Claims**

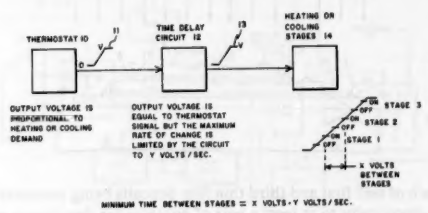


1. An automatic control system for regulating the emission of an X-ray tube of the type which is activated by the heating of a cathode filament by passing current through said filament, and which emits X-ray radiation systematically in accordance with the amount of tube current flowing between the anode and cathode of the tube, said system comprising: circuit means for passing current through said filament; tube current sensing means coupled to said X-ray tube for developing a tube current signal representative of the magnitude of said tube current; means coupled to said tube current sensing means and responsive to said tube current signal for generating a filament current control signal; filament current control means coupled between said filament current control signal generating means and said circuit means and responsive to said filament current control signal for regulating the amount of current passed through said filament; current detector means coupled to said X-ray tube for generating a switching signal in response to the flow of said tube current; said switching means coupled between said tube current sensing means and said filament current control signal generating means and responsive to said switching signal for selectively applying said tube current signal to said filament control signal generating means, whereby the filament circuit of the X-ray tube is automatically switched from a standby mode to an operational only mode when tube current flow in the X-ray tube.

4,072,866
PROPORTIONAL TEMPERATURE CONTROL SYSTEM INCORPORATING A LINEAR DELAY

John L. Kabat, Bloomington, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 1, 1976, Ser. No. 746,378
Int. Cl.[2] H02J 3/14
U.S. Cl. 307—41 11 Claims

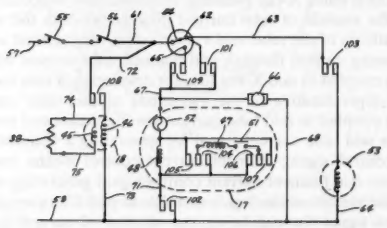

THERMOSTAT 10
TIME DELAY CIRCUIT 12
HEATING OR COOLING STAGES 14
OUTPUT VOLTAGE IS PROPORTIONAL TO HEATING OR COOLING DEMAND
OUTPUT VOLTAGE IS EQUAL TO THERMOSTAT SIGNAL BUT THE MAXIMUM RATE OF CHANGE IS LIMITED BY THE CIRCUIT TO Y VOLTS / SEC.
STAGE 3
STAGE 2
STAGE 1
X VOLTS BETWEEN STAGES
MINIMUM TIME BETWEEN STAGES = X VOLTS ÷ Y VOLTS / SEC.

8. A proportional temperature control system, including: thermostat means generating an output voltage proportional to an ambient temperature; comparator means having input circuit means and output circuit means with said input circuit means coupled to said thermostat means output voltage; voltage limiting means connected to said comparator output circuit means to receive an output voltage from said comparator means with said output voltage being limited in amplitude in both a positive and a negative sense with respect to a reference voltage; integrating amplifier means having an input connected to said voltage limiting means and further having output circuit means; said integrating amplifier means including capacitor means; and said integrating amplifier output circuit means connected to said comparator means input circuit means wherein said comparator means compares an input voltage with an integrating amplifier output voltage; said integrating amplifier output voltage being delayed with respect to time by said capacitor means whenever said input voltage of said comparator means changes an amount greater than a level set by said voltage limiting means to prevent said temperature control system from shifting at an undesirable rate.

4,072,867
MOTOR ENERGIZED LATCH MECHANISM

John D. Goodlaxson, Colfax, Iowa, assignor to The Maytag Company, Newton, Iowa

Filed Apr. 23, 1976, Ser. No. 679,737
Int. Cl.[2] H01H 27/06
U.S. Cl. 307—118 7 Claims

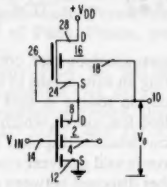


1. A bimetal actuated latch mechanism for an apparatus including an electric motor operable under control of first circuit means during predetermined portions of a cycle of operations, the combination comprising: a bimetal element having a displaceable portion; means for heating said bimetal element to effect movement of said displaceable portion and including a pair of electric terminals; an auxiliary winding on said electric motor for inductively generating a low voltage current when said electric motor is energized; second circuit means for connecting said auxiliary winding to said pair of terminals, said second circuit means being independent of said first circuit means and responsive to said motor operation to effect heating of said bimetal element and to induce movement of said displaceable portion; and latch means responsive to the movement of said displaceable portion.

4,072,868
FET INVERTER WITH ISOLATED SUBSTRATE LOAD

Francisco H. De La Moneda, Reston, and Harish N. Kotecha, Manassas, both of Va., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 16, 1976, Ser. No. 723,678
Int. Cl.[2] H03K 19/08, 19/40; H01L 27/08, 29/78
U.S. Cl. 307—214 6 Claims



1. An IGFET static inverter having an improved load current characteristic, comprising:

an enhancement mode IGFET active device in a main portion of a semiconductor substrate, having its drain connected to an output node, its source connected to a source potential and its gate connected to an input signal source;

said main portion of said substrate connected to a first substrate potential;

a depletion mode IGFET load device in a portion of said semiconductor substrate electrically isolated from said main portion, having its drain connected to a drain potential, its source and gate connected to said output node, and said isolated substrate connected to said output node;

whereby the rise in source-to-substrate bias during the turn off transition is eliminated in said depletion mode load device, providing an improved load characteristic for the inverter circuit.

4,072,869
HAZARD-FREE CLOCKED MASTER/SLAVE FLIP-FLOP

George B. Gillow, Bonita, Calif., assignor to NCR Corporation, Dayton, Ohio

Filed Dec. 10, 1976, Ser. No. 749,490
Int. Cl.[2] H03K 3/286
U.S. Cl. 307—291 10 Claims

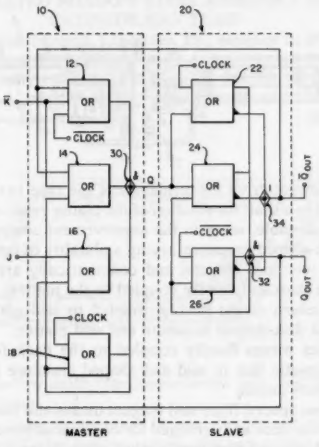
1. A clocked master/slave flip-flop comprising:

a. a master portion for receiving at least data and clock inputs, said master portion comprising plural similar logic elements, each element providing an output to be associated in a manner dissimilar from the manner of logic association of said inputs, the result comprising the output of said master portion responsive to synchronized clock pulses;

b. a slave portion comprising plural similar logic elements, certain ones for receiving as inputs the output of said master portion and said clock inputs, each element providing an output to be associated in a manner dissimilar from the manner of logic association of said inputs to said slave portion to provide the true output of the flip-flop, and similar to the manner of logic association of said inputs to said slave portion to provide the true and complementary outputs of the flip-flop responsive to synchronized clock pulses, said true and complementary outputs providing additional inputs to certain ones of said elements of said

master portion, said true output providing additional inputs to certain ones of said elements of said slave portion;

c. a first redundant logic element defining an additional similar logic element of said master portion, receiving as inputs thereto a data input, an output of said master portion and an output of the flip-flop, and providing an output to be associated in a manner dissimilar from the manner of logic association of said inputs to said first redundant logic element, the result comprising the output of said master portion upon occurrence of a clock skew; and,



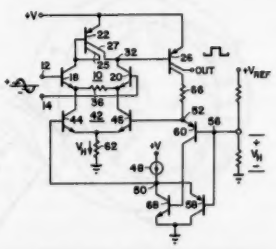
d. a second redundant logic element defining an additional similar logic element of said slave portion, interconnected with said master portion to receive the output thereof, with an output of the flip-flop to receive at an input thereto the output thereof, and providing an output to be associated in a manner dissimilar from the manner of logic association of said inputs to said second redundant logic element, the result comprising an output of the flip-flop upon occurrence of a clock skew.

4,072,870

COMPARISON CIRCUIT HAVING PROGRAMMABLE HYSTERESIS

William F. Davis, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed June 30, 1976, Ser. No. 701,461
Int. Cl.[2] H03K *5/20*
U.S. Cl. 307—350 **15 Claims**



1. A comparison circuit having symmetrical hysteresis, comprising:

a differential input stage including a pair of differentially coupled devices each having first, second and input terminals, and circuit means coupled between said first terminals of said devices for establishing a hysteresis voltage thereacross in response to a current of predetermined magnitude being selectively steered therethrough, said devices receiving first and second applied input signals at said respective input terminals;

output circuit means coupled to said second terminals of said devices being responsive to said input signals for providing a two discrete level output signal at first and second outputs respectively; and

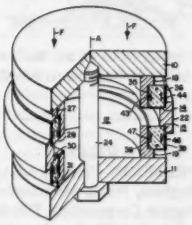
current steering means coupled from said first output of said output circuit means across said circuit means for selectively steering said current through said circuit means in first and second directions depending upon the operating state of said output signal from said output circuit means.

4,072,871

ELECTROACOUSTIC TRANSDUCER

Charles R. Wilson, Glen Burnie, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 20, 1974, Ser. No. 471,922
Int. Cl.[2] H01L *41/04*
U.S. Cl. 310—333 **5 Claims**



1. An electroacoustic transducer comprising:

A. a head mass;

B. a tail mass;

C. piezoelectric type oscillatory material which is active in the shear mode of operation coupled to and supported between said head and tail masses;

D. said oscillatory material being in the form of a plurality of piezoelectric rings each having inner, outer and end planar surfaces;

E. a first support member coupled to said head mass;

F. a second support member coupled to said tail mass;

G. said first and second support members having shoulder portions for respective engagement with a first and second one of said piezoelectric rings; and

H. a third support member common to both said first and second piezoelectric rings.

4,072,872

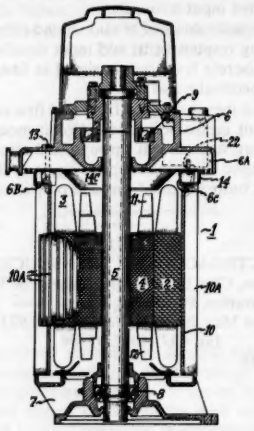
VENTILATING AIR BAFFLE AND DEFLECTOR FOR A DYNAMOELECTRIC MACHINE

Robert F. Gleichman, San Jose, Calif., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 7, 1975, Ser. No. 602,612
Int. Cl.[2] H02K *9/00*
U.S. Cl. 310—53 **11 Claims**

1. A combination baffle and deflector for guiding ventilating air in and around an electric machine, comprising an annulus formed of moldable material, said annulus having a generally U-shaped configuration in cross-section on a radial plane through the central axis and one side thereof, said generally U-shaped configuration consisting of a base portion, an outer leg portion substantially vertically disposed relative to the base portion, an inner leg portion sloped toward the center of the annulus away from said base, a rim portion comprising a plurality of spokes disposed in a plane extending substantially perpendicularly outward from said outer leg portion from an

area thereof closely adjacent the junction of the outer leg portion and said base portion, said base portion and said inner and outer leg portions being formed as an integral unit and



being substantially impervious to air, and wall means defining apertures through said rim portion to enable air to pass therethrough.

4,072,873

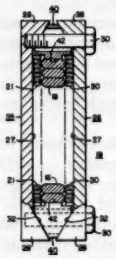
BIAXIAL COMPRESSION PHASE LEAD CONNECTOR

Lawrence D. Nottingham, North Huntingdon, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 9, 1975, Ser. No. 594,479

Int. Cl.² H02K *11/00*

U.S. Cl. 310—71 **6 Claims**



1. In a dynamoelectric machine having a stator member and a plurality of coils constituting a stator winding, each of said coils comprising two conductors spaced apart on the strator member and having end portions disposed adjacent to each other for connection to a phase lead, said end portions of said apart conductors being assembled in overlapping relation with said phase lead, the combination with the union of said coil end portions and said phase lead of a connector comprising a pair of spaced apart plate members, a pair of spaced apart wedge members, and means, for positively securng said plate and wedge members together in assembled relationship and in compressive engagement with said coil end portions and said phase lead; said plate and wedge members having surfaces for uniform engagement with said overlapping conductors, said wedge members being disposed in surface-to-surface contact with said conductors and in sliding engagement with said plate members, said wedge members being displaced inwardly upon said overlapping conductors in a direction normal to the direction of the force of compressive engagement provided by said securing means, whereby biaxial compression of said overlapping conductors is provided as said plate members are forced against said conductors by said securing means.

4,072,874

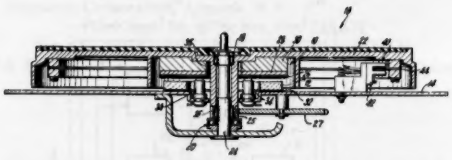
DIRECT DRIVE FOR TURNTABLES

Frank Arnold, Jr., Locust Valley, N.Y., assignor to Kollmorgen Technologies Corporation, Dallas, Tex.

Filed Oct. 14, 1975, Ser. No. 622,450

Int. Cl.² H02K *1/28*

U.S. Cl. 310—268 **11 Claims**



1. A direct drive for turntables of the type having a platter coupled to a shaft for rotation of the platter relative to the deck of the turntable, wherein the improvement comprises:

a disk-shaped armature having a plurality of insulated layers of windings thereon and concentrically arranged about the shaft and fixedly coupled to the platter;

flux return means fixedly coupled to said platter between said disk-shaped armature and said platter;

magnet means fixedly coupled to the deck for providing magnetic flux to said disk-shaped armature and said flux return means;

brushes spaced from said magnet means and fixedly coupled to the deck and arranged for continuous contact with said disk-shaped armature so that when current is applied to said brushes a circuit is completed through said disk-shaped armature with the current in said disk-shaped armature coacting with the magnetic flux from said magnet means to apply rotational forces to said disk-shaped armature for rotating the platter coupled thereto; and

an inertia means coupled between said flux return means and the platter for increasing the inertia of the platter.

4,072,875

X-RAY TUBE

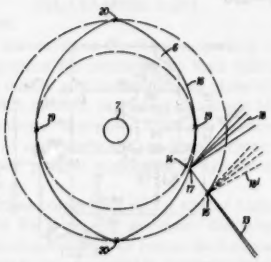
Reginald Sidney Webley, Hillingdon, England, assignor to EMI Limited, Hayes, England

Filed Oct. 18, 1976, Ser. No. 733,220

Claims priority, application United Kingdom, Oct. 18, 1975, 42867/75

Int. Cl.² H01J *35/10*

U.S. Cl. 313—60 **9 Claims**



1. An X-ray tube including an envelope and an anode movable with respect thereto, a source of a beam of energy, for example an electron beam, arranged to impinge on said anode to generate X-radiation substantially at a region of contact with said anode and means for moving said anode in a predetermined manner relative to said tube envelope to move said

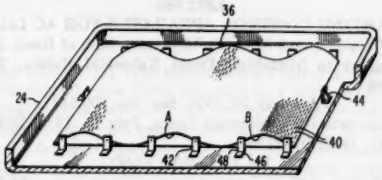
region of contact relative to said tube envelope to scan the generated X-radiation in a predetermined manner relative to said tube envelope.

4,072,876

CORRUGATED SHADOW MASK ASSEMBLY FOR A CATHODE RAY TUBE

Albert Maxwell Morrell, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,349
Int. Cl.[2] H01J *29/07, 29/02*
U.S. Cl. 313—403 28 Claims



1. In a shadow mask type cathode-ray tube, the improvement comprising,

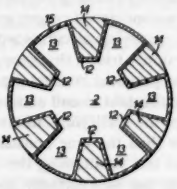
a shadow mask corrugated in one direction having two corrugated sides and two other sides and at least partially suspended in said tube by support means attached at a plurality of points along the corrugated sides of said mask, said mask including a plurality of slit-shaped apertures aligned in columns and the peak-to-peak wavelength dimension of corrugations in the mask being at least twice as great as the spacing between aperture columns.

4,072,877

TRAVELLING WAVE TUBES

Peter Robert Davis, Chelmsford, England, assignor to English Electric Valve Co., Ltd., England

Filed July 30, 1976, Ser. No. 710,130
Int. Cl.[2] H01J *25/34*
U.S. Cl. 315—3.5 8 Claims



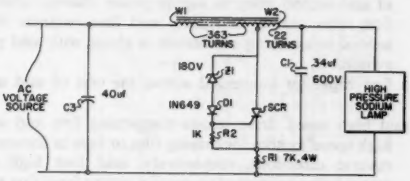
1. A traveling wave tube including a sequence of clover-leaf cavities coupled together for the fundamental mode of operation by coupling plates, each plate having a central aperture through which passes the electron beam path and each clover-leaf cavity having outward radial extensions having permanent magnets between the radial outward extensions thereof in order to provide magnetic focussing for the electron beam.

4,072,878

STARTING AND OPERATING APPARATUS FOR HIGH PRESSURE SODIUM LAMP BALLASTS

Joseph C. Engel, Monroeville, and Gary F. Saletta, Irwin, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 10, 1975, Ser. No. 540,185
Int. Cl.[2] H05B *37/00*
U.S. Cl. 315—205 4 Claims



1. A starting and operating apparatus for connection across an AC source for starting and then operating a high-pressure sodium discharge lamp, said apparatus comprising:

(a) input terminals adapted to be connected across said AC source, output terminals adapted to have said sodium discharge lamp connected thereacross, a power factor correction capacitor connected across said input terminals, a ballast inductor winding having a tap intermediate the ends thereof, and said ballast inductor connected in series at its ends between one of said input terminals and one of said output terminals, and the other of said input terminals electrically connected to the other of said output terminals;

(b) gate-controlled solid-state switching means connected in series with an energy storage capacitor between one end of said ballast inductor and said ballast inductor tap, resistor means connected between said other input terminal and a point in the line between said series-connected solid-state switching means and said energy storage capacitor, and an additional resistor connecting between gate and cathode of said switching means; and

(c) zener diode means, which has a zener voltage greater than the operating voltage for said lamp, connecting across said energy storage capacitor so that the voltage build-up thereacross before said lamp is started is applied across said zener diode means, and said zener diode means also connecting across the gate and anode of said solid-state switching means to gate said switching means when the zener voltage of said zener diode means is exceeded; whereby when said switching means is gated, said energy storage capacitor is discharged through a portion of said ballast inductor to cause the auto-transformer action thereof to apply a lamp starting pulse across said output terminals to start the lamp connected thereacross, and after said lamp is started, the zener voltage of said zener diode means is not exceeded so that the lamp starting portion of said apparatus is rendered inoperative.

4,072,879

TURN-OFF INTERLOCK FOR TAPE AND FILM MACHINES

Edward R. Wadleigh, Star Rte. Box 279, Hemet, Calif. 92343

Filed Apr. 2, 1976, Ser. No. 672,925
Int. Cl.[2] B65H *59/38*
U.S. Cl. 318—57 2 Claims

1. In a film ot tape machine having a power switch for supplying power to the machine, high speed drive means for driving film or tape, and a high speed drive switch connected in series with said power switch to cause power to be supplied to said high speed drive means, a power interlock circuit comprising:

a first relay having first switch contacts and second switch

contacts and a coil, said coil being connected to said high speed drive switch to be energized by the operation thereof, and said first switch contacts being connected between said power switch and said high speed drive means to supply power thereto when said coil is energized,

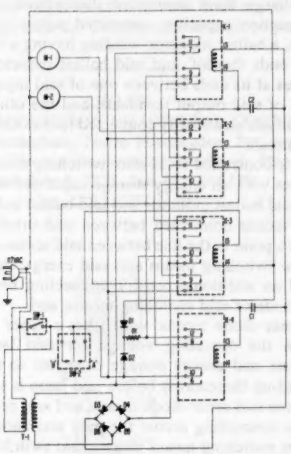
a first source of rectified voltage,

a second relay having first switch contacts and a coil, said second switch contacts of said first relay being connected between said first source of rectified voltage and the coil of said second relay to supply power thereto when said first relay coil is energized, said first contacts of said second relay being connected in shunt with said power switch,

a first capacitor connected across the coil of said second relay,

said high speed drive means comprising first and second high speed motors for driving film or tape in forward and reverse directions, respectively, said first high speed motor being connected to receive power from first switch contacts of said first relay, said interlock circuit further comprising:

a third relay having first switch contacts and second switch contacts and a coil, said coil being connected to said high speed drive switch to be energized by the operation



thereof, the energization of the coils of said first and third relays being mutually exclusive, and said first switch contacts being connected between said power switch and said second high speed motor to supply power thereto when said coil is energized,

a fourth relay having first switch contacts and a coil, said second switch contacts of said third relay being connected between said first source of rectified voltage and the coil of said fourth relay to supply power thereto when said third relay coil is energized, said first contacts of said second relay being connected in shunt with said power switch,

a second capacitor connected across the coil of said fourth relay,

said first relay having third switch contacts, said second relay having second switch contacts, said third relay having third switch contacts, and said fourth relay having second switch contacts, said interlock circuit further comprising:

first brake means for stopping said second high speed motor, said third switch contacts of said first relay and said second switch contacts of said second relay being connected in series between said power switch and said first brake means to supply power thereto when the coil of said first relay is unenergized and the coil of said second relay is energized, and

second brake means for stopping said first high speed motor, said third switch contacts of said third relay and said second switch contacts of said fourth relay being connected in series between said power switch and said second brake means to supply power thereto when the coil of said third relay is unenergized and the coil of said fourth relay is energized.

4,072,880

STARTING CONTROL APPARATUS FOR AC LOAD

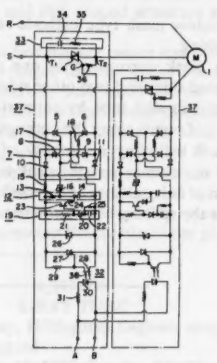
Seiichi Oshima, and Mamoru Miyamoto, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed July 28, 1976, Ser. No. 709,511

Claims priority, application Japan, July 28, 1975, 50-91743; Aug. 13, 1975, 50-98193

Int. Cl.[2] H02K *17/02*

U.S. Cl. 318—227 **16 Claims**



1. A starting control apparatus for an AC load which comprises:

a bidirectional triode thyristor switching device connected in series between an AC power source and the load;

a rectifying circuit connected in parallel to the bidirectional triode thyristor switching device;

a first time constant circuit connected between output terminals of the rectifying circuit which discharges to turn on the bidirectional triode thyristor switching device when the charged potential reaches a predetermined potential;

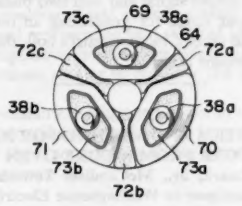
a second time constant circuit connected between the output terminals of the rectifying circuit and having a time constant larger than the time constant of the first time constant circuit and maintaining the charged potential in the ON state of the bidirectional triode thyristor switching device; and

a speedy charging device which rapidly increases the charged potential to the sustaining potential of the second time constant circuit during the recharging period for the first time constant circuit while recovering the controlling ability of the bidirectional triode thyristor switching device and which gradually decreases the period for charging the first time constant circuit to the predetermined potential.

4,072,881
AXIAL-AIR-GAP TYPE SEMICONDUCTOR ELECTRIC MOTOR

Itsuki Ban, 829, Higashioizumi, Nerima, Tokyo, Japan

Filed Sept. 17, 1976, Ser. No. 724,259
Claims priority, application Japan, Nov. 6, 1975, 50-132471; Dec. 20, 1975, 50-151245
Int. Cl.[2] H02K *29/00*
U.S. Cl. 318—138 17 Claims



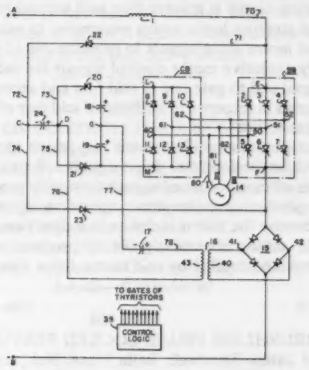
1. An axial-air-gap type semiconductor motor comprising:
a disc-shaped rotor fixed coaxially to a shaft mounted for rotation to a casing for the motor, the disc of said rotor comprising a field magnet having a plurality of magnetic poles formed of portions of said disc located in the circular direction at equal pitches, said magnetic poles being magnetized alternately in opposite polarization directions along the rotating axis of said rotor;
a first magnetic-material disc and a second magnetic material disc coaxially located respectively adjacent the opposite faces of said rotor with air-gaps therebetween and being fixed to said casing;
a plurality of armature coils arranged in turn at angular pitches of a predetermined proportion of the angular width of the pole of said field magnet, odd-numbered ones of said armature coils being affixed to the face of said first magnetic-material disc which faces said rotor, and even-numbered ones of said armature coils being affixed to the face of said second magnetic-material disc which faces said rotor;
a control band rotatable synchronously with said rotor;
position-detector means located at fixed positions along the rotating path of said control band for detecting rotational position of said rotor in cooperation with said control band to generate an output corresponding to the rotational position of said rotor; and
a current control semiconductor circuit for controlling, in response to the output from said position-detector means, current flowing through said armature coils.

4,072,882
FREQUENCY CURRENT CONVERTER FOR ENERGIZING AN AC MACHINE

Albert Charles Wiart, Sannois, and Pierre Jacques de la Jonquiere, Fontainebleau, both of France, assignors to Jeumont-Schneider, Puteaux, France

Filed June 10, 1976, Ser. No. 694,493
Claims priority, application France, June 16, 1975, 75 18861
Int. Cl.[2] H02P *7/62*
U.S. Cl. 318—227 13 Claims

1. A variable frequency current converter for energizing an alternating current polyphase motor from an adjustable direct current source comprising:
a direct current power supply;
a current-fed inverter responsive to said direct current power supply including a plurality of paired main thyristors mounted in a bridge between corresponding phases of said motor and two pole terminals;
a commutation bridge including a plurality of paired diodes mounted in a bridge between corresponding phases of said motor and two commutation poles;
a common commutation capacitor operatively controlled concurrently with firing of an on-coming one of said paired main thyristors for turning off and off-going one of said paired main thyristors, said on-coming and off-going main thyristors being associated with a common one of said pole terminals and the commutation process being caused by said commutation capacitor through one of said paired diodes of said commutation bridge associated with

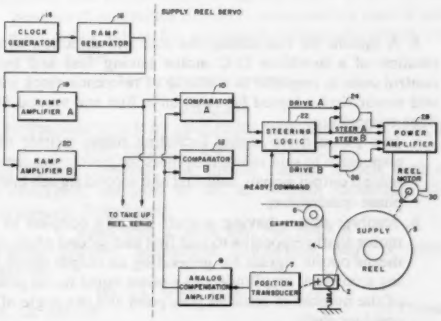


the one of said commutation poles opposite to said one pole terminal;
with capacitor means connected between said commutation poles and charged during the commutation process for transferring energy from the motor phase related to said off-going main thyristor to the motor phase related to said on-coming main thyristor via said one diode of said commutation bridge.

4,072,883
BI-DIRECTIONAL MOTOR DRIVE SERVO

Glenn A. Beiter, Louviers, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 26, 1976, Ser. No. 690,295
Int. Cl.[2] G05B *11/28*
U.S. Cl. 318—257 5 Claims



1. A motor drive system comprising
signal generating means for producing a first polarity repetitive ramp signal and a second polarity repetitive ramp signal,
error signal generating means for producing an output signal having a polarity representative of a desired motor drive direction,
a first comparator means arranged to compare said output signal with said first ramp signal to produce a first constant amplitude motor drive signal pulse for each of said

first ramp signals with a duration equal to the time during the rise time of said first ramp signal that said output signal is greater than said first ramp signal,

a second comparator means arranged to compare said output signal with said secod ramp signal to produce a second constant amplitude motor drive signal pulse for each of said second ramp signals with a duration equal to the time during the rise time of said second ramp signal that said output signal is greater than said second ramp signal,

signal steering logic means responsive to said first and second motor drive signals to produce one of a pair of mutually exclusive motor control signals for each motor drive signal and to gate one of said first and second motor drive signals in response to said one of said pair of motor control signals, and

motor power amplifier means responsive to a gated one of said first and second drive signals and to said one of said pair of motor control signals to supply power to a motor to produce a motor drive operation in response thereto whereby the motor is driven in a direction determined by said motor control signals to produce a motor drive torque controlled by said motor drive signals.

4,072,884

BRUSHLESS PHASE LOCKED SERVO DRIVE

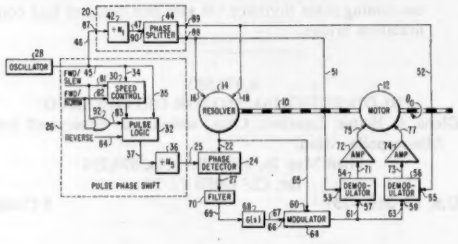
Richard Julian Treadwell, Belle Mead, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 19, 1976, Ser. No. 659,267

Claims priority, application United Kingdom, Mar. 25, 1975, 12395/75

Int. Cl.[2] H02P *5/00*

U.S. Cl. 318—314 **9 Claims**



5. A system for controlling the rate and direction of shaft rotation of a brushless D-C motor having first and second control coils in response to a source of reference clock pulses, said motor shaft adapted for rotation in first and second directions comprising:

a. two phase drive means including phase splitter means responsive to said reference pulses for generating first and second output signals, said first and second signals being in phase quadrature;

b. resolver means having a shaft directly coupled to said motor shaft responsive to said first and second phase drive means output signals for generating an output signal having a constant amplitude and a phase equal to the product of the number of resolver pole pairs and the angle of said resolver shaft;

c. phase shift means responsive to said reference clock pulses and a plurality of control signals for generating an output signal having a phase which varies as a function of time, said control signals indicative of shaft rate and direction of rotation;

d. phase detection means responsive to said resolver means output signal and said phase shifting means output signal for generating an output signal having an amplitude equal to the phase difference between said resolver means and phase shifting means output signals;

e. modulation means having an output and first and second inputs thereof; said second input being coupled to the output of said resolver means;

f. shaping means coupling the output of said phase detector to said first input of said modulation means;

g. first demodulation means responsive to the modulation means output signal and said two phase drive means first output signal for generating an output signal to energize said first motor control coil, and

h. second demodulation means responsive to said modulation means output signal and said two phase drive means second output signal for generating an output signal to energize said second motor control coil; thereby commutating said motor coils.

4,072,885

CONTROL SYSTEM AND METHOD FOR REMOVAL OF COKE FROM A COKE OVEN

Lawrence W. Emark, Jr., McCandless Township, Pittsburgh County, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 3, 1975, Ser. No. 628,441

Int. Cl.[2] C10B *35/00*

U.S. Cl. 318—600 **27 Claims**

1. A control system for providing incremental position regulation of a first apparatus in relation to the positional movement of a second apparatus, including the combination of,

means for providing a position control signal in accordance with the desired position of said first apparatus,

means responsive to said position control signal for providing first signal pulses at a first rate for controlling the actual positonal movement of said first apparatus

means responsive to said first signal pulses for providing second signal pulses at a second rate in accordance with the desired positional movement of said second apparatus,

means responsive to the actual positional movement of said second apparatus for providing third signal pulses in accordance with said actual positional movement of said second apparatus, and

means responsive to said second signal pulses and said third signal pulses for controlling the actual positional movement of said second apparatus.

4,072,886

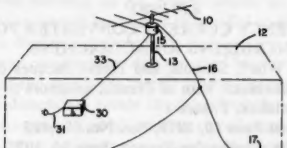
APPARATUS FOR REMOTE CONTROL OF ANTENNA ROTATORS

Ned E. Dammeyer, New Bremen, Ohio, assignor to Crown Controls Corporation, New Bremen, Ohio

Filed Sept. 27, 1976, Ser. No. 726,766

Int. Cl.[2] G05B *19/28*

U.S. Cl. 318—602 **9 Claims**



1. Apparatus for controlling from a remote location the position of an antenna rotator including

a control unit comprising

antenna position selecting means,

control transmitter means responsive to said position selecting means for providing a first output signal containing the selected antenna position information,

means for initiating the transmission of output signals from said control transmitter means,

holding circuit means for continuing the output of said

selected antenna position information from said control transmitter means, and

first receiver means responsive to a second output signal for terminating the operation of said holding circuit means;

and an antenna rotator control circuit associated with said antenna rotator and comprising

second receiver means responsive to the first output signal of said control transmitter for providing an electrical signal representing the selected antenna position,

means for comparing electrical signals representing the actual position of said antenna rotator with said electrical signal representing said selected position,

means responsive to said comparing means for causing said antenna rotator to rotate to the selected position, and

release transmitter means responsive to said antenna rotator reaching its selected location for producing a second output signal to terminate the operation of said holding circuit means.

4,072,887

APPARATUS FOR ADJUSTING THE MUTUAL DISTANCES OF SEVERAL ELEMENTS ARRANGED SIDE BY SIDE, PARTICULARLY PAIRS OF BLADES FOR THE STRAIGHT-LINE CUTTING OF SHEET MATERIAL

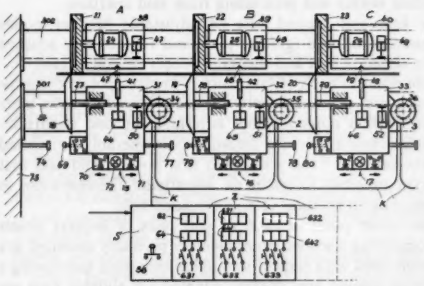
Gerhard Buschmann, Dusseldorf, and Reinhard Spohr, Dusseldorf-Nord, both of Germany, assignors to Jagenberg-Werke AG, Dusseldorf, Germany

Filed Jan. 27, 1976, Ser. No. 652,930

Claims priority, application Germany, July 11, 1974, 2433302

Int. Cl.[2] G05B *11/01*

U.S. Cl. 318—675 **7 Claims**



1. In an apparatus for adjusting and maintaining the mutual distances between a first movable element and a second movable element wherein each of said movable elements is connected to a drive means therefor, each of said drive means, in turn, is connected to a control unit, the improvement wherein said control unit comprises measuring means for measuring the distance said first element is moved by said first drive means, said measuring means operable to generate a signal and feed the same to a distance travel regulating means, said distance travel regulating means connected to said second drive means whereby said second element is moved, in transpositioning direction, precisely the same distance that said first element is moved, wherien said first element has a first sensor responsive to a fixed stop position, said second element has a second sensor responsive to said first element, each of said sensors connected to said control unit and to feed a signal thereto, each of said drive means is provided with a reverse phase, said control unit includes a first reversing means for reversing the direction of travel of said drive means and controlling the distance by which said drive means moves in response to a predetermined value, a second reversing means attached to said second sensor and to said second drive means and responsive to the position of said first element, whereby when said second sensor is activated it generates a signal in said control unit activating said second reversing means whereby the travel of said second element is reversed, first reposition measuring means which determines the distance by which said first element moves from said fixed stop position to its new position of predetermined value, and second reposition measuring means connected to said second reversing means, said second reposition measuring means connected to and responsive to the signal of said first reposition measuring means whereby to limit the reverse travel of said second element from the first element's new position so that it is precisely the distance between said fixed stop position and said new position.

4,072,888

METHOD OF CONTROLLING A STEPPER MOTOR

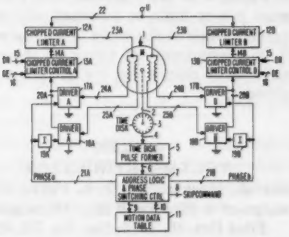
Bastian Bechtle, Stuttgart; Claus Schuenemann, Schoenaich; Gisbert Skudelny, Echterdingen; Wilhelm Spruth, Dagersheim; Helmut Weis, Waldenbuch, and Volker Zimmermann, Sindelfingen, all of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 28, 1975, Ser. No. 572,593

Claims priority, application Germany, May 2, 1974, 2421219

Int. Cl.[2] G05B *19/40*

U.S. Cl. 318—685 **13 Claims**



1. A method of controlling a stepping motor that is generating feedback pulses indicative of position comprising the steps of:

establishing in a memory a sequence of predetermined time delay values for successive motor advance pulses for a predetermined velocity-position profile for said motor; and

applying said feedback pulses representation of the current position of said motor to select corresponding ones of said time delay values for generating subsequent motor advance pulses.

4,072,889

ELECTRONICALLY STABILIZED FEEDER DEVICE FOR THE SUPPLY OF DC CURRENT

Kurt Witmer, Zollikon, and Roland Cachin, Zurich, both of Switzerland, assignors to Dr. K. Witmer Elektronik AG, Erlenbach, Switzerland

Filed Sept. 2, 1976, Ser. No. 719,926

Claims priority, application Switzerland, Sept. 3, 1975, 11391/75

Int. Cl.[2] G05F *1/58, 1/62, 1/64*

U.S. Cl. 323—9 **21 Claims**

1. An electrically stabilized feeder device for supplying direct current to a load through a load circuit comprising:

power supply means for supply DC voltage to said load circuit;

regulating means connected at least partly seially in said load circuit;

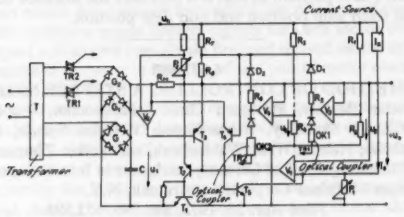
control selecting means connected to operate said regulating means;

an adjustable load current controlling means connected to said control selecting means, said load current controlling

means operating to limit the current to said load circuit to a selected predetermined value;

an adjustable load voltage controlling means connected to said control selecting means, said load voltage controlling means operating to maintain, under certain conditions, the load voltage at a selected predetermined value;

and power controlling means connected to said control selecting means, said power controlling means being responsive to output power, formed by the product of said current in said load circuit and of said load voltage;



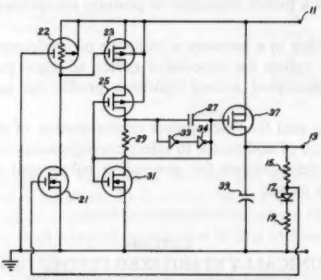
said control selecting means effecting operation of said regulating means when said power controlling means senses a power which is at least approximately like a specified maximum power limit, to automatically alter either the load voltage value or the value of said current in the load circuit, in dependency of which of these values being externally set to ensure that the maximum power limit is not exceeded.

4,072,890

VOLTAGE REGULATOR

L. V. Westbrook, Hopkins, and R. L. Payne, Crystal, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 18, 1976, Ser. No. 733,450
Int. Cl.[2] G05F 1/56
U.S. Cl. 323—22 R **4 Claims**



1. An integrated circuit voltage regulator for converting an unregulated potential applied to an input conductor into a regulated potential supplied to an output conductor comprising, in combination:

at least first, second and third insulated-gate field-effect transistors each having a gate electrode and a transconductive channel,

means for applying a potential having an amplitude related to said regulated potential to the gate of said first transistor,

a timing capacitor,

means for charging said timing capacitor through the series combination of the channels of said first and second transistors,

means for discharging said timing capacitor through the series combination of a substantially constant resistance and the channel of said third transistor,

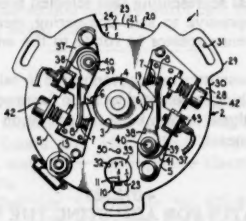
and means for reversing the conductivity states of said second and third transistors when the voltage across said timing capacitor reaches a predetermined value.

4,072,891

TIMING DISPLAY IGNITION PLATE ASSEMBLY

Monty A. Campbell, 1518 NW. Vivian Road, Kansas City, Mo. 64118

Filed June 21, 1976, Ser. No. 698,478
Int. Cl.[2] F02P 17/00
U.S. Cl. 324—16 T **6 Claims**



1. An ignition assembly for use on a multi-cylinder internal combustion engine having a spark ignition system including electrical power means, a coil with primary and secondary elements, a spark plug for each cylinder, a rotating cam having a first and second timing mark thereon and a reference timing mark fixedly disposed on said engine, said ignition assembly comprising:

a. an ignition plate having a central aperture therethrough and mountable on said engine whereby said cam is disposed within and protruding from said aperture;

b. a first and second pair of adjustable breaker points mounted on said ignition plate and respectively adapted for timing a first and second cylinder of said engine;

c. one point of each of said pairs of breaker points comprising a first portion fixedly attached to said ignition plate with a first point member adjustable on said fixedly attached first portion; a threaded bolt operably connected between said fixedly attached first portion and said first point member to effect an adjustment therebetween in response to rotation of said threaded bolt;

d. the other point of each of said pairs of breaker points comprising a second point member pivotally mounted at a point fixed with respect to said ignition plate and having a spring loaded arm portion adapted for slidable cam engagement to open and close said first and second point members; said threaded bolt, in effecting said adjustment, adjusting the dwell between said first and second point members;

e. built-in dynamic stroboscopic illumination means having mechanical connection with said ignition plate and electrical connection with said first and second pair of breaker points whereby in operation in said engine said illumination means produces a flash of light in response to engine operated breaker point function;

f. said built-in illumination means including a multiple position switch having electrical connection between said first and second pair of breaker points and said illumination means, said switch being selectively movable from an off position wherein said illumination means is rendered inoperative to a respective first and second on position wherein said first and second pairs of breaker points selectively actuate said illumination means;

g. timing mark viewing means associated with said ignition plate, said built-in illumination means being located on said ignition plate in conjunction with said viewing means to illuminate and expose to view said first and second timing marks and reference timing mark during engine operation, whereby said first and second pairs of breaker

points are independently adjustable in absence of external equipment and during engine operation by selectively moving said switch to the respective on positions and rotating the respective bolts until said first and second timing marks are properly aligned with said reference timing mark.

4,072,892

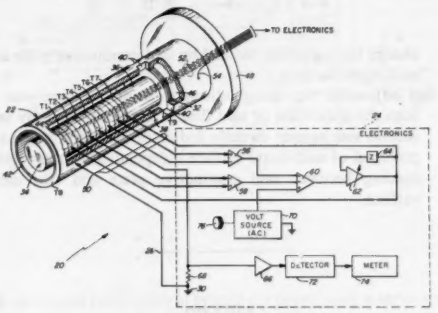
ELECTROLYTIC MEASUREMENT SYSTEM WITH AN INNER POST AND AN OUTER CYLINDRICAL SHIELD FLUID BOUNDARY

Earl R. Lind, Portsmouth, R.I., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 644,499, Dec. 29, 1975, abandoned. This application Feb. 22, 1977, Ser. No. 772,362

Int. Cl.[2] G01N *27/42*

U.S. Cl. 324—30 B **4 Claims**



1. An electrolytic measurement system comprising:

a passage for fluid having a boundary formed of an inner post and an outer cylindrical shield,

a plurality of electrodes flush-mounted along the surface of said post within said boundary for making contact with said fluid, said electrodes being positioned in a serial arrangement along an axis of said passage;

means for electrically energizing a plurality of outer ones of said electrodes which are symmetrically positioned about a center of said arrangement;

means including pairs of said electrodes symmetically positioned between said outer electrodes and an inner one of said electrodes for signaling the presence of an electric current flowing between said outer electrodes and said inner electrode, said signaling means being coupled to said energizing means for maintaining a constant magnitude of electric field between said outer electrodes and said inner electrode independently of electrode resistance of said inner and outer electrodes;

means coupled between said outer electrodes and said inner electrode for measuring electric current flow between said outer electrodes and said inner electrode.

4,072,893

APPARATUS FOR DETERMINING THE ANGULAR POSITION OF A ROTATING MEMBER USING REFERENCE AND POSITION ELEMENTS THAT GENERATE OPPOSITE POLARITY BIPOLAR SIGNALS

Franco Huwyler, Monza (Milan), Italy, assignor to Fabbrica Italiana Magneti Marelli S.p.A., Milan, Italy

Filed June 30, 1976, Ser. No. 701,148

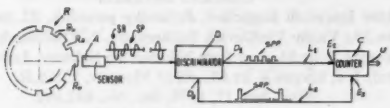
Claims priority, application Italy, Oct. 10, 1975, 28152/75

Int. Cl.[2] G01R *33/12*

U.S. Cl. 324—208 **6 Claims**

1. Apparatus for determining the angular position of a rotating member, said member having a reference element and a plurality of position elements, the structure of said reference element being different from the structure of said position elements, said elements being angular spaced about said rotating member in the direction of rotation said apparatus comprising:

sensor means responsive to the relative structure of the reference and position elements for generating a bipolar reference signal each time said reference element moves past a reference point and for generating a bipolar position signal each time one of said position elements moves past said reference point, each of said bipolar reference and position signals comprising an alternating positive and negative pulse, the order of occurrence of said positive and negative pulses of said bipolar reference signal being opposite to that of the bipolar position signals;



discriminator means responsive to the order of said positive and negative pulses of said bipolar reference and said bipolar position signals for distinguishing between said bipolar reference and said bipolar position signals and, for generating a unipolar reference signal or a unipolar position signal each time said sensor means generates one of said bipolar reference or one of said bipolar position signals, respectively;

signal generating means responsive to said unipolar reference and unipolar position signals for generating an output signal indicative of the angular position of said rotating member relative to said reference point.

4,072,894

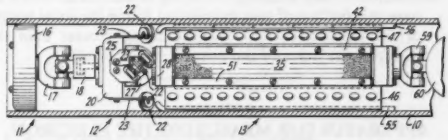
ROTATING PIPELINE INSPECTION APPARATUS

Robert D. Barton, Houston, Tex., assignor to AMF Incorporated, White Plains, N.Y.

Continuation of Ser. No. 299,009, Oct. 19, 1972, abandoned, which is a continuation of Ser. No. 56,491, July 20, 1972, abandoned. This application Sept. 19, 1975, Ser. No. 615,003

Int. Cl.[2] G01R *33/12*

U.S. Cl. 324—221 **16 Claims**



1. Apparatus for nondestructively inspecting a pipeline by means of inspection apparatus which is propelled through the interior of the pipeline by a fluid which is being transported therethrough, said apparatus comprising

means extending longitudinally within a portion of said pipeline and spaced from the wall thereof for establishing a magnetic field directed transversely to the axis of said portion of pipeline,

magnetic pole means circumferentially spaced about the wall of the pipeline for directing said magnetic field into the wall of said portion of pipeline to establish a circumferentially directed magnetic flux field therein,

a longitudinally extending fin or flap of elastomeric material secured along its longitudinal dimension to said apparatus in the same portion thereof as said means for establishing the magnetic field, said fin extending outwardly with a curved shape toward said wall in a region of the pipeline

circumferentially spaced from said magnetic pole means and occupying a circumferential section less than 180°,

flux leakage detection means disposed longitudinally along the length of said fin at its outwardly extending portion,

said curved fin or flap urging said detection means into firm but resilient contact with the wall of the pipeline,

means operable in response to the movement of said apparatus through the pipeline to impart a rotary motion to said apparatus, whereby said detection means follows a helical path along the wall of the pipeline.

4,072,895

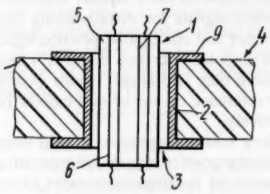
EDDY CURRENT CONVERTER FOR NON-DESTRUCTIVE TESTING OF ELECTRICALLY CONDUCTING COATING IN HOLES OF PRINTED CIRCUIT BOARDS

Viktor Igorevich Rogachev, Jurievsky pereulok, 22, korpus 2, kv.55.; Vasily Vasilievich Sukhorukov, 2, Vladimirskaya, 50, korpus 2, kv.51., and Petr Nikolaevich Shkatov, Lefortovsky val, 7/6, korpus 4, kv.69., all of Moscow, U.S.S.R.

Filed Jan. 27, 1976, Ser. No. 652,891

Int. Cl.² G01R *33/12*

U.S. Cl. 324—238 **3 Claims**



1. An eddy current converter for non-destructive testing of electrically conducting coating in holes of printed circuit boards, comprising:

a cylindrical frame inserted in a hole being tested of a printed circuit board;

a winding enveloping said cylindrical frame, said winding being inserted for testing together with said cylindrical frame into said hole of the printed circuit board being tested, said winding when energized inducing eddy currents in said coating and sensing the induced eddy currents; and

conductors of said winding extending in an axial direction all over the surface of said cylindrical frame the axial length of the conductors and cylinder being greater than the depth of the holes of the printed circuit boards.

4,072,896

APPARATUS FOR MEASURING THE ELECTRON ESCAPE POTENTIAL OF METAL SURFACES

Paul Frederik Adriaan Bijlmer, Nieuw-Vennep, Netherlands, assignor to Fokker-VFW B.V., Schiphol-Oost, Netherlands

Filed June 23, 1976, Ser. No. 699,204

Claims priority, application Netherlands, June 23, 1975, 7507475

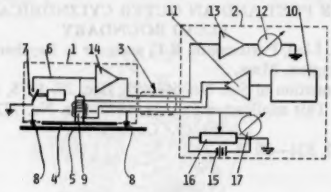
Int. Cl.² G01R *27/26*

U.S. Cl. 324—61 P **2 Claims**

1. In apparatus for measuring the electron escape potential of a metal surface which includes a conductive plate disposed is closely spaced parallel relation to a metal surface at which the electron escape potential is to be measured; means for vibrating said conductive plate in a direction vertical to said metal surface; circuit means connected to said conductive plate for measuring the potential difference between said metal surface and said conductive plate and including first mechanism for indicating such potential difference; the improvement which comprises:

external circuit means including a source of potential, divider means connected across said source of potential and including an adjustable tap connected to said metal surface, and second mechanism for indicating the potential difference between said tap and said source of potential; and

switch means for temporarily connecting said conductive plate to said source of potential prior to measurement to



charge the capacitor defined by said conductive plate and said metal surface;

said adjustable tap being adjusted during measurement to zero the indication of said first mechanism whereby said second mechanism directly indicates the electron escape potential of said metal surface independent of the precise spacing between said conductive plate and said metal surface.

4,072,897

EQUIVALENT LOAD-PULL CHARACTERIZATION OF MICROWAVE TRANSISTORS

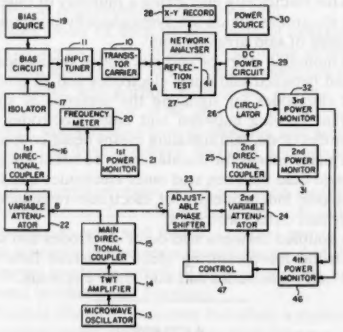
Yoichiro Takayama, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan

Filed Oct. 21, 1976, Ser. No. 734,422

Claims priority, application Japan, Oct. 23, 1975, 50-127673

Int. Cl.² G01R *31/22, 27/04*

U.S. Cl. 324—158 T **4 Claims**

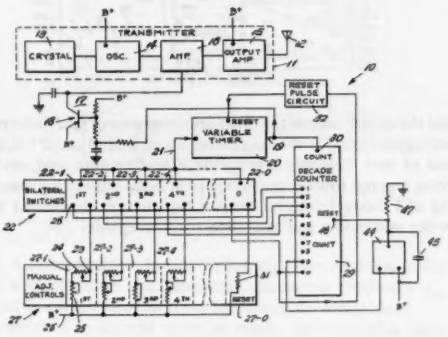


1. A method for measuring, by the use of a microwave signal, load characteristics of a microwave transistor having an input and an output terminal pair, comprising the steps of: branching a first and a second signal from said microwave signal; adjusting the amplitude and phase of said second signal to provide an adjusted signal; supplying said first signal through an input tuner network to said input terminal pair; supplying said adjusted signal to said output terminal pair simultaneously with supplying said first signal to said input pair to make said transistor produce a reflected signal across said output terminal pair; and measuring said adjusted signal and said reflected signal.

4,072,898
REMOTE CONTROL RADIO SYSTEM

Robert R. Hellman, Bridgeport, and Douglas M. French, Clinton, both of Conn., assignors to Westport International, Milford, Conn.

Filed June 9, 1975, Ser. No. 585,249
Int. Cl.[2] H04B 1/00
U.S. Cl. 325—37 11 Claims

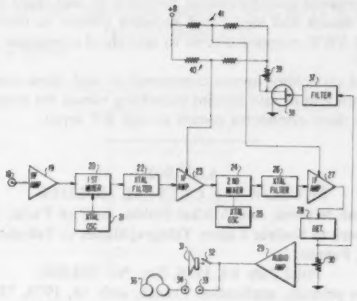


1. A remote radio control system for positioning a servo unit in accordance with the setting of an adjustable control comprising broadcast means for broadcasting a radio wave upon energization, means for energizing the broadcast means to provide a broadcast period and for effecting deenergization of the broadcast means to provide a silent period with a broadcast period and a silent period constituting a segment, means interconnected with the adjustable control for adjusting the duration of the silent period in accordance with the setting of the adjustable control; radio wave receiving means for remotely receiving the wave and providing a detected signal having one state for an extent essentially corresponding to the broadcast period and another state for an extent essentially corresponding to the silent period, means connected to receive the detected signal and interconnected with the servo unit for producing and applying a control signal to the servo unit that is related to the extent of the another state with the servo unit assuming a position dictated by the control signal; in which the system has a pluraity of servo units, in which there is at least one individually adjustable control for each servo unit, in which the means for energizing the broadcast means causes a plurality of successive segments with the plurality of segments constituting a sequence and in which there are means for associating each adjustable control with only one segment in the sequence, in which the radio wave receiving means provides a detected signal for each segment, in which the means for producing and applying produces a segment control signal for each segment detected signal and applies each segment control signal to only one servo unit whereby each segment in the sequence dictates through its segment control signal the position of a servo unit in accordance with the setting of its associated one of the adjustable controls, in which there are means for energizing and deenergizing the broadcast means to produce a reset broadcast period in each sequence, and in which the last named causes the duration of each broadcast period of each segment to be essentially constant and to have the duration of the reset broadcast period be a multiple of the duration of a broadcast period for a segment.

4,072,899
RF LEAK DETECTOR

Richard L. Shimp, Waynesboro, Va., assignor to Comsonics, Inc., Harrisonburg, Va.

Filed Apr. 26, 1976, Ser. No. 680,412
Int. Cl.[2] H04B 17/00
U.S. Cl. 325—67 12 Claims



1. A method of detecting RF leaks due to defects in the shielding of a coaxial RF communications medium comprising the steps of:

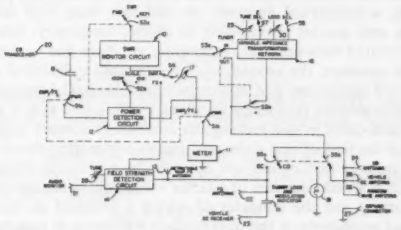
applying an RF signal, which is modulated by a unique signal, to the coaxial RF communications medium, and

detecting said unique signal with a narrow band receiver and antenna to thereby detect small amounts of RF leakage from the coaxial RF communications medium at the locations of defects in the shielding.

4,072,900
CB RADIO ACCESSORY UNIT

Carl L. Ray, 218 Woodland Hills Drive, Biloxi, Miss.

Filed May 23, 1977, Ser. No. 799,785
Int. Cl.[2] H04B 17/00
U.S. Cl. 325—67 7 Claims



1. A CB radio accessory unit comprising:

an indicating meter means;

a first connector means for connecting to a CB radio;

an SWR monitor circuit connected to said first connector means to provide signals capable of being indicated on said meter means;

a power detection circuit switchably coupled to said first connector means to provide signals capable of being indicated on said meter means;

a field strength detection circuit having an RF input to provide signals capable of being indicated on said meter means;

a first switching means connected to said meter means for selectively connecting said SWR monitor circuit, said power detection circuit and said field strength detection circuit to said meter means to indicate said signals;

a second connector means for connecting to a vehicle broadcast band receiver and coupled to said RF input;

a third connector means for connecting to an antenna usable with a CB radio;

an impedance transformation network connected between said first connector means and said third connector means;

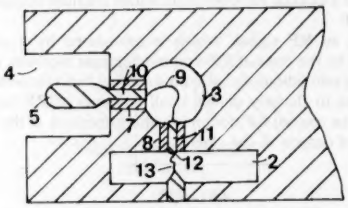
a second switching means connected to said SWR monitor circuit, said impedance transformation network and said third connector means for selectively connecting said impedance transformation network to said third connector means and said SWR monitor circuit or connecting said SWR monitor circuit to said third connector means; and

a third switching means connected to said third connector means and to said second switching means for connecting said third connector means to said RF input.

4,072,901
MICROWAVE CRYSTAL HOLDER

Jean-René Mahieu, and Michel Robin, both of Paris, France, assignors to Societe Lignes Telegraphiques et Telephoniques, Paris, France

Filed July 14, 1976, Ser. No. 705,030
Claims priority, application France, July 18, 1975, 75 22594
Int. Cl.² H04B *1/26*; H01P *1/00*
U.S. Cl. 325—445 **3 Claims**



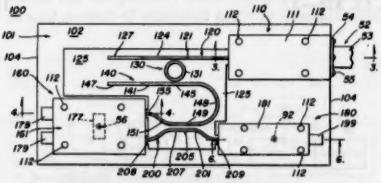
1. A wafer crystal holder for frequency converters operating at millimeter wavelength, comprising a high conductivity metallic body having a square slot in an end face thereof, and a rectangular aperture in a side face thereof through which a modulated carrier frequency and a local frequency are propagated, a cylindrical aperture on said side face, two coaxial stubs, one quarter wavelength at carrier frequency, the first one located between said rectangular aperture and said cylindrical aperture, the second one between said cylindrical aperture and said square slot, an output standard coaxial connection for intermediate frequency positioned within said slot, a wafer crystal located in said rectangular aperture in contact with one end of the first of said stubs, and means connecting the ends of said stubs in said cylindrical aperture by a wire the length of which is an odd number of quarter wavelengths at said carrier frequency and the diameter of which is selected so that the output impedance at the intermediate frequency is matched to the characteristic impedance of said standard coaxial output connection.

4,072,902
RECEIVER MODULE AND MIXER THEREOF

Robert M. Knox, La Grange, and Peter P. Toulios, Westchester, both of Ill., assignors to Epsilon Lambda Electronics Corporation, Batavia, Ill.

Division of Ser. No. 592,065, June 30, 1975, Pat. No. 3,995,238. This application Nov. 8, 1976, Ser. No. 740,014
Int. Cl.² H04B *1/26*
U.S. Cl. 325—446 **11 Claims**

1. A mixer for use in the frequency range from about 1 GHz to about 1,000 GHz comprising a base plate defining a conductive image plane, a housing mounted on said plate and cooperating therewith to define a cavity, a mixer diode mounted within said cavity and having an output coupling therefor extending out of said cavity, an elongated high permittivity dielectric waveguide of finite cross section adjacent to said image plane and extending into said cavity, and a thin film of synthetic organic resin disposed between and secured to both said image plane and said dielectric waveguide and extending laterally thereof, said thin film being low loss in character and having a low permittivity compared with that of said dielectric waveguide, the ratio between the thickness of said thin film

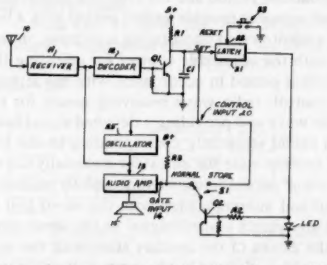


and the square root of the cross-sectional area of said dielectric waveguide being in the range from about 0.02 to about 1.0, the end of said dielectric waveguide extending into said cavity being tapered toward said diode to provide impedance matching and mode transformation of the energy transmitted between said cavity and said dielectric waveguide.

4,072,903
STORAGE CIRCUIT FOR PAGING RADIO RECEIVERS

Raymond W. Harris, Rustburg, Va., assignor to General Electric Company, Lynchburg, Va.

Filed Dec. 10, 1976, Ser. No. 749,390
Int. Cl.² H04M *11/02*
U.S. Cl. 325—466 **9 Claims**



1. An improved paging receiver circuit comprising:

a. first means for connection to said receiver and having an output for producing a paging signal in response to a predetermined signal received by said receiver;

b. a latch having an input connected to said first means output, and having an output for producing a latched signal in response to said paging signal;

c. audio means having a control input connected to said first means output, having a gate input, and having an output, said audio means producing an audible signal at said output in response to the presence of said paging signal or said latched signal at said control input and in response to said latched signal at said gate input;

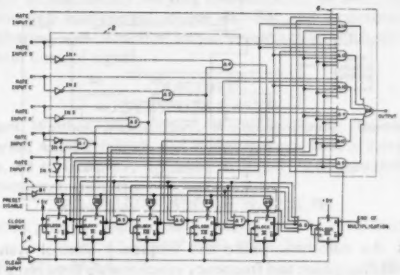
d. switching means connected to said latch output for selectively supplying said latched signal to said gate input or said control input of said audio means;

e. and second means connected to said control input of said audio means for causing said audio means to produce an audible sound in response to said switching means transferring said latch output from said control input of said audio means to said gate input of said audio means.

4,072,904
PRESETTABLE RATE MULTIPLIER

Paul G. Casner, Ellicott City, and Edward J. McDevitt, Laurel, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 23, 1976, Ser. No. 725,746
Int. Cl.[2] H03K *21/00, 23/06*
U.S. Cl. 328—39 11 Claims



1. A rate multiplier, having a plurality of ordered rate inputs and a clock input, for generating an output frequency f_{out} which is a fraction of an input frequency f_{in}, comprising:

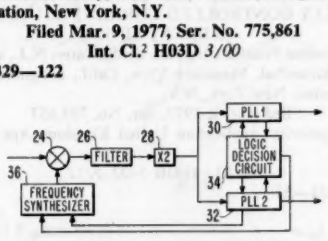
a series of connected counting stages, each counting stage being clocked by the input clock and having a preset input which, when enabled, locks the counting stage into a given output state which inhibits the counting stage from counting when clocked, and

logic circuit means, having the ordered rate inputs as inputs and having outputs connected to the series of connected counting stages, for controlling the enabling of the preset input of each counting stage so that no preset input can be enabled unless the preset inputs of all previous counting stages in the series are also enabled.

4,072,905
WIDE ACQUISITION RANGE MSK DEMODULATOR INPUT CIRCUIT

James Malcolm Keelty, Montreal, Canada, assignor to RCA Corporation, New York, N.Y.

Filed Mar. 9, 1977, Ser. No. 775,861
Int. Cl.[2] H03D *3/00*
U.S. Cl. 329—122 7 Claims



5. In combination,

input means providing a signal having first and second discrete spectral lines in the frequency spectrum,

a pair of phase locked loops (PLL) coupled to said input means each settable to at least two operating frequencies,

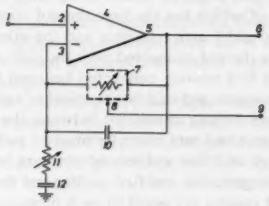
means coupled to said input means for scanning the frequency of said signal until one of said PLLs locks to one of said spectral lines, and

decision circuit means responsive to the locking of said one PLL to one of said spectral lines to cause said second PLL to assume one or the other of its operating frequencies to lock said second PLL to said second spectral line.

4,072,906
VARIABLE GAIN AMPLIFIER WITH ADJUSTABLE UPPER FREQUENCY LIMIT

Ernst Schröder, Hannover, Germany, assignor to Licentia Patent-Verwaltungs G.m.b.H., Frankfurt am Main, Germany

Filed Sept. 27, 1976, Ser. No. 727,372
Claims priority, application Germany, Sept. 25, 1975, 2542745
Int. Cl.[2] H03F *1/36*
U.S. Cl. 330—86 2 Claims

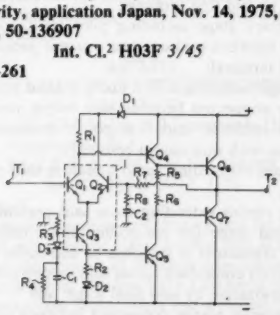


1. In an amplifier circuit arranged to be connected in a useful signal path and having a variable transmission factor and an effective transmission frequency band delimited by a lower limit frequency which can be varied as a function of a control voltage, the circuit including an amplifier member and circuit components defining a feedback path connected between the output of the amplifier member and an input thereof which is inverting with respect to the output signals of the amplifier member, the components defining the feedback path including an electronically voltage-controllable resistor having a control voltage input and a first frequency dependent impedance connected in parallel with the resistor, and the circuit further including a second frequency dependent impedance connected between the inverting input of the amplifier member and a point at the circuit reference potential, and means for supplying the control voltage to the control voltage input of the controllable resistor, the improvement comprising means defining a resistive impedance connected in series with said second frequency dependent impedance for setting the upper limit frequency of the effective transmission band of said circuit at a selected value.

4,072,907
AMPLIFIER CIRCUIT

Mamoru Sekiya, and Nobuyuki Sakabe, both of Nagoya, Japan, assignors to Shin-Shirasuna Electric Corporation, Nagoya, Japan

Filed Nov. 11, 1976, Ser. No. 740,979
Claims priority, application Japan, Nov. 14, 1975, 50-136906; Nov. 14, 1975, 50-136907
Int. Cl.[2] H03F *3/45*
U.S. Cl. 330—261 2 Claims



1. An amplifier circuit including a differential amplifier circuit comprising a first transistor, a second transistor and a third transistor, the emitters of said first and second transistors being connected to each other, the collector of said third transistor being coupled to the connection between the emitters of said first and second transistors; a fourth transistor

having the base thereof connected with the collector of said first transistor and having the emitter thereof coupled to one terminal of a power source; a fifth transistor having the base thereof connected with the emitter of said third transistor and having the emitter thereof coupled to the other terminal of said power source; voltage drop producing means; the collectors of said fourth and fifth transistors being connected with each other via said voltage-drop producing means; and a single-ended push-pull amplifier circuit comprising at least two transistors one of which has the base thereof connected with the collector of said fourth transistor and the other one of which has the base thereof connected with the collector of said fifth transistor; a first resistor connected between the collector of said first transistor and said one terminal of said power source, and a second resistor connected between the emitter of said third transistor and said other terminal of said power source, the values of said first and second resistors being selected so that the voltage across said first resistor and the voltage across said second resistor are equal to each other.

4,072,908

AUDIO AMPLIFIER WITH CONSTANT CURRENT CONSUMPTION

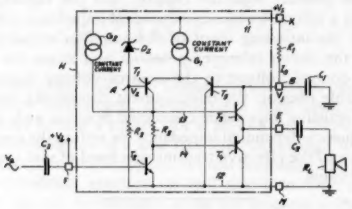
Bruno Murari, Monza (Milan), and Pietro Menniti, Milan, both of Italy, assignors to SGS-ATES Componenti Elettronici S.p.A., Agrate Brianza (Milan), Italy

Filed Jan. 21, 1977, Ser. No. 761,404

Claims priority, application Italy, Jan. 22, 1976, 19468/76

Int. Cl.[2] H03F 3/183

U.S. Cl. 330—265 **8 Claims**



1. An amplifier for audio signals, comprising:

a source of direct current having a first and a second terminal:

an output resistor and a constant-current generator connected to said first terminal;

a preliminary stage including pilot transistor means connected between said constant-current generator and said second terminal;

a final stage including a first and a second power transistor serially connected between said output resistor and said second terminal, said first power transistor forming a junction with said output resistor;

input means for feeding audio signals to said pilot transistor means;

a biasing circuit extending from said preliminary stage to said final stage for controlling the conduction of said power transistors in response to said audio signals;

a load circuit connected across said second power transistor for energization by said final stage; and

current-sensing means connected between said final stage and said preliminary stage for modifying the control of said conduction by said biasing circuit to maintain a substantially constant flow of direct current in said final stage, said current-sensing means comprising a feedback transistor with an input tied to said junction, said feedback transistor being connected between said constant-current generator and said second terminal in parallel with said pilot transistor means.

4,072,909

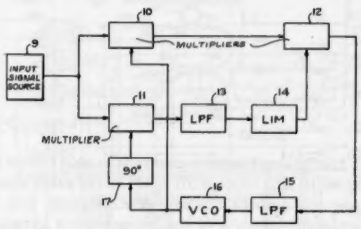
AUTOMATIC PHASE AND FREQUENCY CONTROL SYSTEM

Richard W. Citta, Oak Park, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Sept. 27, 1976, Ser. No. 727,095

Int. Cl.[2] H03B 3/04

U.S. Cl. 331—12 **8 Claims**



1. An automatic phase and frequency control system for producing phase and frequency synchronism between a locally generated signal and an input signal comprising:

oscillator means producing an oscillatory signal having a frequency responsive to a control signal;

generating means producing first and second beat signals between said input signals and said oscillatory signal, said beat signals having a substantially quadrature relationship;

translating means converting said first beat signal to a constant amplitude signal having a phase relative to said second beat signal which varies in a predetermined relationship to said beat signal frequency, said translating means being capable of coupling a D.C. signal;

first multiplying means multiplying said second beat signal and the output signal of said translating means to develop a control signal, said second beat signal being applied to said multiplying means such that the relative amplitude of said output signal of said translating means and said second beat signal remain substantially constant and the relative phase therebetween varies as a function of beat signal frequency; and

first filter means coupling said control signal to said oscillator means.

4,072,910

VOLTAGE CONTROLLED OSCILLATOR HAVING EQUALLY CONTROLLED CURRENT SOURCE AND CURRENT SINK

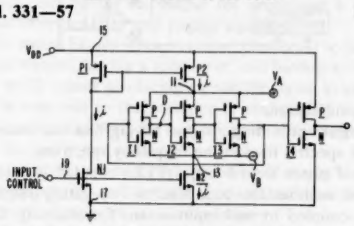
Andrew Gordon Francis Dingwall, Bridgewater, N.J., and Bruce David Rosenthal, Mountain View, Calif., assignors to RCA Corporation, New York, N.Y.

Filed Apr. 1, 1977, Ser. No. 783,657

Claims priority, application United Kingdom, Apr. 9, 1976, 14608/76

Int. Cl.[2] H03B 5/02, 5/12

U.S. Cl. 331—57 **8 Claims**



1. The combination comprising:

an oscillator, having two voltage terminals, whose output frequency varies as a function of the voltage applied across said two voltage terminals;

first and second power terminals for the application therebetween of an operating voltage;

a current source connected between said first power terminal and one of said two voltage terminals;

a current sink connected between said second power terminal and the other one of said two voltage terminals;

an input control terminal adapted to receive a control signal;

control means coupled between the input control terminal and said current source and current sink responsive to the amplitude of the signal at said control terminal for maintaining the amplitude of the current through said current source substantially equal to that through said current sink for monotonically varying the amplitude of said current through said current source and sink and monotonically altering said oscillator output frequency as a function of said control signal.

4,072,911

DYESTUFF LASER

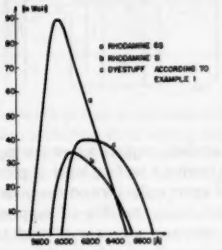
Herbert Walther, Junkersdorf; Wolfgang Hartig, Bornheim-Hersel; Adolf Friedrich, and Roderich Raue, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 1, 1975, Ser. No. 573,785

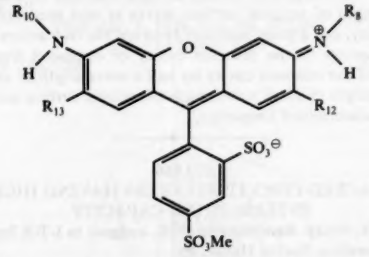
Claims priority, application Germany, May 4, 1974, 2421607

Int. Cl.[2] H03F *3/00;* **F21K** *2/00*

U.S. Cl. 331—94.5 L **4 Claims**



1. Dyestuff laser capable of generating a coherent emission in a wavelength range of 550 to 680 nm consisting of a reservoir containing a laser dyestuff solution and a pumping light source coupled thereto capable of exciting the dyestuff solution so that it emits, in which said dyestuff solution comprises a solvent which does not interfere with the emission and a concentration sufficient to emit laser beams of a dyestuff of the formula



wherein:

R_8 and R_{10} are alkyl of 1–4 C atoms;

R_{12} and R_{13} are hydrogen or alkyl of 1–4 C atoms; and Me is hydrogen, potassium, sodium, ammonium monoalkylammonium, dialkylammonium or trialkylammonium ions, said alkyl containing 1–4 C atoms.

4,072,912

NETWORK FOR TEMPERATURE COMPENSATION OF AN AT CUT QUARTZ CRYSTAL OSCILLATOR

Bortolo Mario Pradal, Pittsburgh, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 12, 1976, Ser. No. 741,405

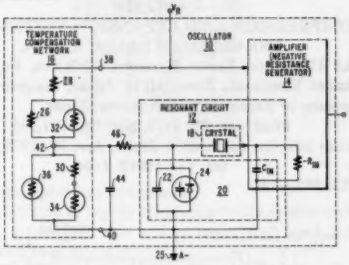
Int. Cl.[2] H03B *5/04, 5/32*

U.S. Cl. 331—116 R **9 Claims**

1. In a crystal oscillator of the type including a resonant circuit and means for sustaining oscillations in said resonant circuit, said resonant circuit including in loop connection a voltage variable capacitance device and a crystal, said crystal having a temperature dependent self-resonant frequency, and a predetermined frequency drift characteristic, said oscillator further including means for generating a bias signal having an aplitude varying in accordance with temperature, said bias signal being applied to said voltage variable capacitance device to vary the capacitance of said device to compensate for temperature dependent changes in said crystal self-resonant frequency,

said bias signal matching a predetermined theoretical compensation voltage versus temperature curve at a plurality of predetermined temperatures within a predetermined range of temperatures,

said means for generating said bias signal comprising a temperature dependent potential dividing network means, responsive to a fixed bias potential applied across first and second terminals, for providing said bias signal between said second terminal and a third terminal, the improvement wherein:



said crystal has a frequency drift characteristic approximately in accordance with an equation of the third degree in temperature change having upper and lower inflection points within said predetermined range of temperatures; and

said temperature dependent potential dividing means comprises first, second, third, fourth, fifth and sixth resistances, said first, second and third resistances exhibiting substantially zero temperature coefficients and said fourth, fifth and sixth resistance exhibiting predetermined negative temperature coefficients;

a parallel connection of said first and said fourth resistances;

said parallel connection being serially coupled with said second resistance between said first and third terminals;

said third and said fifth resistances being serially coupled between said second and third terminals; and

said sixth resistance being coupled between said second and third terminals.

4,072,913

FEED FORWARD PASSIVE COUPLING SYSTEM AND METHOD

Richard V. Snyder, Old Bridge, N.J., assignor to Harvard Industries, Inc., Farmingdale, N.J.

Filed Feb. 3, 1976, Ser. No. 654,989

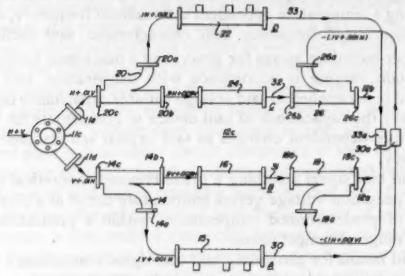
Int. Cl.[2] H01P *5/12, 1/16*

U.S. Cl. 333—6 **17 Claims**

1. A feed forward passive coupling system for separation of at least a first and a second signal portion into at least first and second signal components of differing frequencies where said first and second signal portions have a majority of said second and first components respectively and a minority of said first and second components respectively comprising

first means for combining a predetermined second sample of said second signal portion and a predetermined part of said first signal portion to produce substantially said second component, means for coupling out and reversing the sign of said second sample of said second signal portion and producing a predetermined part of said second signal portion, and

second means for combining a predetermined first sample of said first signal portion and said predetermined part of said



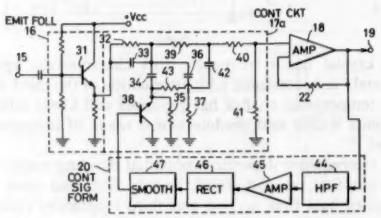
second signal portion to produce substantially said first component.

4,072,914

COMPRESSION AND EXPANSION SYSTEM WITH ENLARGED DYNAMIC RANGE

Yutaka Haramoto, Zama; Kazunori Nisikawa, Fujisawa, and Masami Yamazaki, Zama, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Apr. 28, 1976, Ser. No. 681,255
Claims priority, application Japan, Apr. 30, 1975, 50-51261
Int. Cl.² H04B *1/64*
U.S. Cl. 333—14 **7 Claims**



1. A compression system comprising:

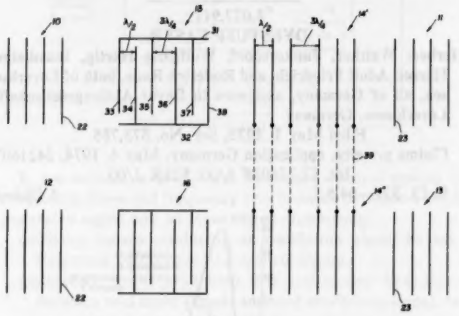
means for changing a flat frequency characteristic to a characteristic which raises from said flat characteristic in a high-frequency range to a characteristic which lowers from the flat characteristic in a high-frequency range, said changes occurring in a manner such that said frequency characteristic approaches said raised characteristic as the level of an input signal becomes smaller and approaches said lowered characteristic as the level of the input signal becomes larger, said frequency characteristic changing means including a variable impedance element having an impedance which is varied responsive to a control signal, a variable high-frequency range increasing circuit means responsive to the variation of the impedance of said variable impedance element for relatively increasing the high-frequency component of the input signal in comparison with the low-frequency component thereof when said input signal is of a low level, and a variable high-frequency range decreasing circuit means responsive to the variation of the impedance of said variable impedance element for relatively decreasing the high-frequency component of said input signal in comparison with the low-frequency component thereof when said input signal is of a high level, said variable high-frequency range increasing circuit means and said variable high-frequency range decreasing circuit means being commonly connected to said single variable impedance element; and means for forming said control signal responsive to the level of said input signal of said frequency characteristic changing means and for applying said control signal to said variable impedance element of the control circuit means, thereby varying the impedance thereof.

4,072,915

ACOUSTIC SURFACE WAVE DEVICES

Richard F. Mitchell, Merstham, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 10, 1976, Ser. No. 721,967
Claims priority, application United Kingdom, Sept. 19, 1975, 38577/75
Int. Cl.² H03H *9/04, 9/26, 9/32*; H01L *41/04*
U.S. Cl. 333—72 **14 Claims**



1. An acoustic surface wave resonator device comprising, a substrate having a surface layer of piezoelectric material, a pair of spaced apart reflectors on the piezoelectric surface forming a resonant cavity capable of supporting an acoustic surface standing wave at or near a predetermined frequency, and means for coupling with acoustic surface standing wave energy in the resonator, the coupling means including two similar arrays of parallel conductive strips on the piezoelectric surface transverse to the length of the cavity and located between the pair of reflectors, the strips of each array having a centre-to-centre spacing of half a wavelength or an odd integral multiple of half a wavelength of acoustic surface waves at said predetermined frequency, the spacing between the two arrays being a quarter wavelength or an odd integral multiple of a quarter wavelength of acoustic surface waves at said predetermined frequency, and a point mid-way between the two arrays being at the centre of the resonant cavity or displaced from the centre of the resonant cavity by half a wavelength or an integral multiple of a half wavelength of acoustic surface waves at said predetermined frequency.

4,072,916

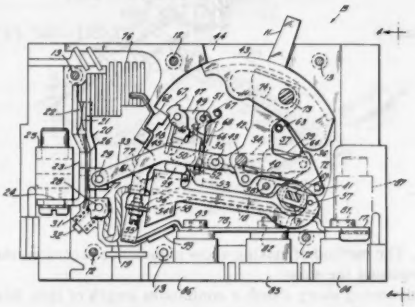
STACKED CIRCUIT BREAKERS HAVING HIGH INTERRUPTING CAPACITY

Frank W. Kussy, Randallstown, Md., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Dec. 19, 1975, Ser. No. 642,497
Int. Cl.² H01H *75/00*
U.S. Cl. 335—16 **12 Claims**

1. A circuit breaker including stationary contact means; movable contact means operable into and out of engagement with said stationary contact means to respectively close and open said circuit breaker; an operating mechanism for moving said movable contact means to open and close said circuit breaker; automatic trip means to actuate said mechanism to open said circuit breaker when said circuit breaker is subjected to fault current conditions; first and second spaced terminals; circuit means, including said movable and fixed contact means, extending between said terminals; said circuit means also including first and second elongated sections with said first section constituting at least part of an arm mounting said mov-

able contact means and connected to said mechanism to be movable thereby for opening and closing said circuit breaker; with said circuit breaker closed, said sections being in confronting closely spaced relationship with currents flowing therethrough in opposite directions to create a magnetic blow-off force tending to open said circuit breaker prior to actuation of said mechanism to open said circuit breaker; said operating mechanism including a toggle connected to said arm and including first and second links connected at a movable knee which, for all positions of said arm, remains on the same side of



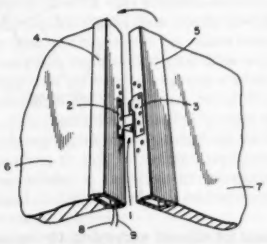
a straight line extending between pivots at opposite ends of said toggle; said mechanism also including main spring means connected to said toggle at said knee to provide power for opening and closing said circuit breaker; said first section being pivoted to a pivot at one end thereof and mounting the movable contact means at the other end thereof; said second section at one end thereof mounting said stationary contact means and said first terminal being at the other end thereof; said first terminal being disposed in the general vicinity of said one end of said first section.

4,072,917

SWITCH ACTUATING HINGE

Michael Haag, Chicago, and Herman P. Pichler, Franklin Park, both of Ill., assignors to Rixson-Firemark, Inc., Franklin Park, Ill.

Filed Apr. 5, 1976, Ser. No. 673,603
Int. Cl.[2] H01H 9/00
U.S. Cl. 335—205 **6 Claims**



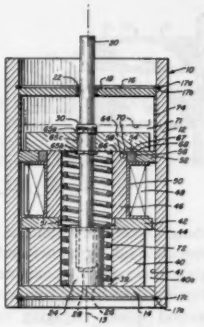
1. In a switch actuating hinge in which the hinge has a door leaf and a jamb leaf both having mounting screw holes with each hole adapted to receive the head of an associated mounting screw, the improvement comprising a magnet actuated switch carried by the jamb leaf, a permanent magnet carried by the door leaf, an adjusting screw retained within one of the door leaf mounting holes and having a head substantially identical to that of the mounting screws, and means coupling the adjusting screw to the magnet whereby adjustment of the screw from the exposed face of the door leaf when mounted effects the relative positioning of the magnet and the switch with a resultant change in switch actuating sensitivity.

4,072,918

BISTABLE ELECTROMAGNETIC ACTUATOR

Reginald A. Read, Jr., Brookfield, Ill., assignor to Regdon Corporation, Brookfield, Ill.

Filed Dec. 1, 1976, Ser. No. 746,338
Int. Cl.[2] H01F 3/12, 7/08
U.S. Cl. 335—236 **13 Claims**



1. Magnetic apparatus comprising:

a hollow housing of highly magnetically permeable material, having a principal axis and an inner wall, said housing being closed at one end;

a magnet in in close magnetic contact with said closed end of said housing, and substantially axially aligned with said principal axis, said magnet forming a gap of at least a first dimension with said inner wall;

a shunt piece, of highly magnetically permeable material, in close magnetic contact with said magnet and substantially axially aligned with said principal axis, said shunt piece forming a gap with said inner wall of substantially a second dimension, said second dimension being less than said first dimension;

a coil;

a core, of highly permeable magnetic material, in close magnetic contact with said shunt piece and substantially axially aligned with said principal axis, said coil being disposed about said core and said core including a portion extending axially beyond said coil;

a pole piece, of highly magnetically permeable material, disposed adjacent said coil and about that portion of said core extending beyond said coil, in close magnetic contact with said inner wall of said housing and forming a gap between an inner surface of said pole piece and said portion of said core;

armature means, including an armature plate, of highly magnetically permeable material, disposed for reciprocal movement in said housing between first and second positions, along said principal axis, said plate being disposed to overlie, in close magnetic contact, said core and said pole piece in said first position, and to have a gap of at least a third dimension with at least one of said pole piece and said core in said second position; and

means for urging said armature plate to said second position.

4,072,919

SOLENOID CONSTRUCTION

John G. Clary, Pasadena, Calif., assignor to Addmaster Corporation, San Gabriel, Calif.

Filed Nov. 3, 1976, Ser. No. 738,452
Int. Cl.[2] H01F 7/16
U.S. Cl. 335—257 **5 Claims**

1. A solenoid comprising a bearing sleeve, a stop element of

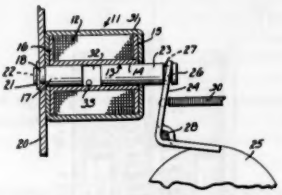
magnetic material in said sleeve adjacent one end of said sleeve,

said stop element forming a first flat sphere engaging surface,

an armature of magnetic material slidable endwise within said sleeve adjacent the opposite end of said sleeve,

said armature forming a second flat sphere engaging surface,

means for inducing magnetic flux between said stop element and said armature whereby to attract said armature towards said stop element, and



a shock absorbing sphere of elastomeric material within said sleeve intermediate said armature and said stop element,

said sphere being freely mounted between said armature and said stop element and being compressible between said first and second sphere engaging surfaces whereby to arrest said armature,

said sphere engaging surfaces being parallel to each other and at right angles to the direction of movement of said armature.

4,072,920

MAGNETIC HOLDING DEVICE

Theodore D. Wright, St. Paul, Minn., assignor to K & F Manufacturing Co., Inc., Granger, Ind.

Continuation of Ser. No. 556,686, March 10, 1975, abandoned. This application Mar. 26, 1976, Ser. No. 670,829

Int. Cl.[2] H01F *7/20*

U.S. Cl. 335—285 **10 Claims**

1. A magnetic device for holding a printing plate or the like comprising:

a base plate made of rigid, substantially non-magnetic material, said base plate exhibiting an arcuately curved outer surface,

a plurality of spaced-apart rigid strips of magnetic material arranged at the outer surface of the base plate,

magnet strips located in respective spaces between said rigid strips, and

mechanical locking means for holding said rigid strips and said magnet strips in position at said base plate, said locking means including recess means at said base plate which are lockingly engageable over the respective extreme axial end portions of said rigid strips and said magnet strips to hold said strips against movement both radially outwardly of said base plate and axially in the direction of said strips.

4,072,921

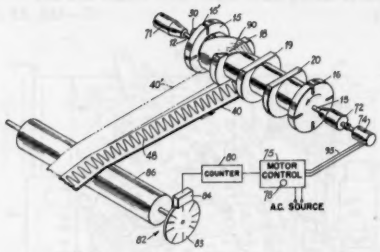
LOW INDUCTANCE PRECISION RESISTOR DEPOSITED ON AN ADHESIVE BACKING AND WOUND ON A BOBBIN

Peter John Sacchetti, Manchester, N.H., assignor to AMF Incorporated, White Plains, N.Y.

Filed Apr. 27, 1976, Ser. No. 680,717

Int. Cl.[2] H01C *3/02*

U.S. Cl. 338—61 **16 Claims**



1. The method of making a low inductance precision resistor comprising the steps

advancing along a path a continuous length of thin, flexible tape of electrical insulating material,

depositing a continuous length of resistor wire in a sinuous pattern on a surface of side said advancing tape,

winding said tape with the resistor wire thereon onto the axial extending portion of a bobbin that includes radially extending flanges at each end, the side of the tape having the wire thereon being placed in contact with the bobbin when commencing the winding.

4,072,922

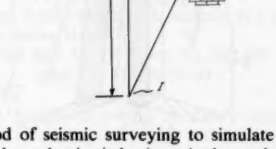
METHOD FOR SEISMIC EXPLORATION FOR ENHANCED RESULTS IN SIMULATED CYLINDRICAL OR PLANE WAVES

M. Turhan Taner; Robert E. Sheriff, and H. Neal Reeves, all of Houston, Tex., assignors to Seiscom Delta Inc.

Filed Nov. 13, 1975, Ser. No. 631,715

Int. Cl.[2] G01V *1/20, 1/16*

U.S. Cl. 340—15.5 CP **12 Claims**



1. A method of seismic surveying to simulate travel of a seismic wave through seismic horizons in the earth, comprising the steps of:

a. establishing a seismic source at a position to emit seismic waves into the earth;

b. establishing seismic sensors along at least one line sensor array of length greater than or equal to the diameter of a circular region for the deepest horizon of interest in which all raypaths for seismic waves from the seismic source at a highest frequency of interest differ in phase from each other by less than one-half wavelength at such highest frequency of interest;

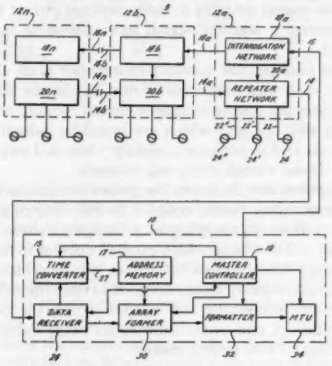
c. emitting seismic waves from the seismic source; and
d. sensing the response of the seismic horizons to the emitted waves at the sensors so that the responses sensed at the receivers contribute to, and supplement each other due to the difference in their phase.

4,072,923

MULTICHANNEL SEISMIC TELEMETER SYSTEM AND ARRAY FORMER

Lee E. Siems, and Paul M. Morgan, both of Houston, Tex., assignors to Western Geophysical Co. of America, Houston, Tex.

Filed Mar. 8, 1976, Ser. No. 664,617
Int. Cl.[2] G01V *1/22*
U.S. Cl. 340—15.5 TS **4 Claims**



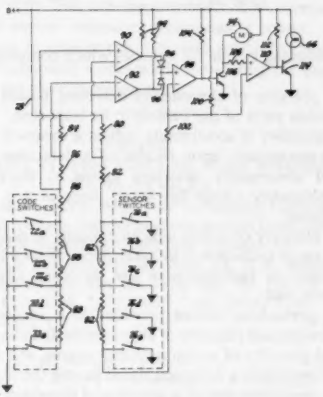
1. In a seismic data system comprising a central station; a plurality of remote transceivers, each having a plurality of input channels; a broadband transmission link including an interrogation channel connecting said transceivers in series to said central station; means in each said transceiver, coupled to said interrogation channel for applying a fixed delay to said interrogation signals, for regenerating said interrogation signals, and for transmitting said interrogation signals down-link to the next-in-series transceiver, the fixed delay being less than the sum of the digital-data-word length plus the two-way signal propagation delay through the interrogation channel; a plurality of spaced elemental seismic sensor units connected to supply analog seismic signals to corresponding input channels in each said transceiver; means in each said transceiver for sampling input seismic signals and for converting the amplitudes and polarities thereof into multibit, self-clocking, floating-point, phase encoded digital data words having a predetermined length in time, the respective bit values being defined by coded phase reversals, each said digital data word being divided into a number of bit intervals having a width equal to an integral submultiple of the digital data word length; control means in each said transceiver coupled to said interrogation channel for applying digital data words from each channel of each said transceiver to said broadband transmission link, in constant current mode, in response to interrogation signals received from said central station over said interrogation channel, the improvement wherein:
the leading edge of the leading bit of each said data word always has the same given polarity trend, the improvement further including:
first means in each said transceiver for receiving digital data words from respective down-link transceivers, and for regenerating and retransmitting said digital data words up-link;
second means in said central station for receiving digital data words from said respective transceivers; and
sensing means included in said first means and said second means for sensing said given polarity trend as the beginning of a digital data word and means for detecting the end of a digital data word by counting the number of phase reversals in the direction of said given polarity trend that occur within a prescribed multiple of the bit interval.

4,072,924

AUTOMOTIVE PRIORITY MESSAGE DISPLAY

Allen J. Pomerantz, Bancroft, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed May 12, 1975, Ser. No. 576,617
Int. Cl.[2] G08B *19/00*
U.S. Cl. 340—52 F **3 Claims**

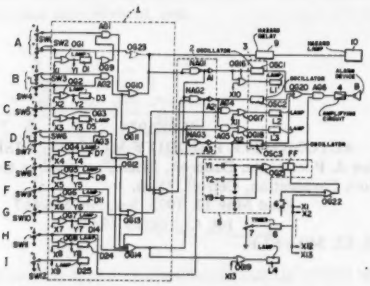


1. A system for singly indicating the occurrence of any of a plurality of events in a motor vehicle and for indicating only the event of most significance when more than one event occurs concurrently, comprising
a display device for selecting messages for display and for singly displaying messages corresponding to the events,
code means controlled by the display device for producing a first electrical signal having a different voltage magnitude for each selected message,
a plurality of sensors each comprising a switch actuated in response to an event,
means for producing a second electrical signal in response to sensor actuation, the voltage magnitude of the second signal for each sensor being distinctive and having a predetermined correspondence to the magnitude of the first electrical signal for the message appropriate to the sensed event, the magnitudes of the second electrical signal being arranged in order of priority of the significance of the events, and including means for preferentially producing the signal magnitude of highest priority when a plurality of sensors are actuated concurrently,
and voltage level comparator means comparing the first and second electrical signals to determine correspondence between the selected message and the sensed event of highest priority and for controlling the display device to select and display the message corresponding to the sensed event of highest priority.

4,072,925
WARNING SYSTEM FOR VEHICLES

Michio Yashima, Kawagoe; Takaya Senzaki, Iruma, and Norimitsu Kurihara, Wako, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan

Filed Dec. 18, 1975, Ser. No. 642,136
Claims priority, application Japan, Dec. 23, 1974, 49-147877
Int. Cl.[2] G08B *19/00*
U.S. Cl. 340—52 F 7 Claims



1. A warning system for vehicles which comprises in combination:

(a) a plurality of abnormality detecting means disposed at various parts of the vehicle to be inspected;

(b) a plurality of abnormality indicator means to be actuated instantaneously upon receipt of a detection signal from said abnormality detecting means to thereby indicate abnormality which has taken place at any part of the vehicle;

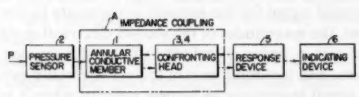
(c) a plurality of action indicator means to notify a vehicle driver of the action to be taken depending on the degree of danger or emergency in the abnormal situation taken place; and

(d) a preferential circuit provided in a connecting circuit between said plurality of abnormality detecting means and said plurality of action indicator means, and to introduce preferentially a detection signal having the highest degree of emergency out of a plurality of detection signals from said abnormality detecting means into said action indicator means corresponding to such detection signal.

4,072,926
TIRE PRESSURE WARNING APPARATUS

Yoichi Shimahara, and Takashi Shimada, both of Takatsuki, Japan, assignors to The Toyo Rubber Industry Co., Ltd., Osaka, Japan

Continuation of Ser. No. 426,737, Dec. 20, 1973, abandoned.
This application Sept. 24, 1975, Ser. No. 616,360
Claims priority, application Japan, Dec. 30, 1972, 48-2836; Apr. 20, 1973, 48-45455
Int. Cl.[2] B60C *23/02*
U.S. Cl. 340—58 2 Claims



1. A tire pressure warning apparatus for a vehicle having a pneumatic tire mounted on a rotatable wheel fixed to an axle of the vehicle, and comprising:

pressure sensor means supported in said tire for sensing the tire air pressure;

switch means coupled to said pressure sensor means and switchable between an open-circuit state and a closed circuit state in response to the sensing of an abnormal value of tire air pressure;

an annular conductive member secured to said wheel and electrically connected in series with said switch means;

a pair of spaced confronting heads fixed to a stationary portion of said vehicle such that said heads are stationary when said tire and wheel are rotating, said heads being disposed adjacent to said annular conductive member and adapted to form an electrical non-resonant impedance coupling (A) therewith when said switch means is in said closed circuit state;

response circuit means mounted on said stationary portion and electrically coupled to said confronting heads for producing an output signal only when said switch means is switched from one of its states to the other in response to said abnormal value of tire pressure to form said impedance coupling; and

indicator means coupled to said response circuit means for producing a warning signal in response to said output signal;

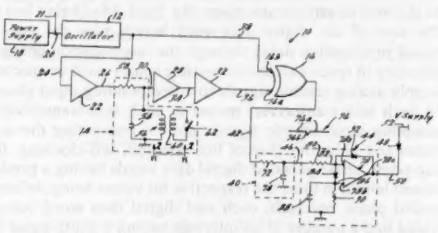
wherein said annular conductive member is an elctromagnetic coil, and said confronting heads are electrically unconnected electromagnetic heads which are spaced along said coil and which are mutually inductively coupled via said impedance coupling when said switch means is in closed circuit state; and wherein

said response circuit means comprises continuously operating transmitter means coupled to only one of said heads for continuously applying an A.C. signal thereto to induce in said coil a voltage which causes a current to flow in said coil only when said switch means is in said closed circuit state, and receiver means coupled to only the other of said heads for producing said output signal, the continuous operation of said transmitter means being independent of the state of said switch means.

4,072,927
TIRE PRESSURE MONITOR

Walter K. O'Neil, Southfield, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Feb. 15, 1977, Ser. No. 768,810
Int. Cl.[2] B60C *23/02*
U.S. Cl. 340—58 10 Claims



1. A monitoring system for activating a warning device in response to a change in condition of an object, said system comprising:

means for producing a first cyclic signal;

a resonant circuit including reactive means, said resonant circuit excited by said first cyclic signal and operative to produce a second cyclic signal shiftable in phase relative to said first cyclic signal in response to changes in effective impedance of said resonant circuit;

means associated with said reactive means and operative in response to said change in condition of said object to change the effective impedance of said resonant circuit and shift the phase of said second cyclic signal relative to said first cyclic signal; and

detector means operative to produce an output signal representative of the difference in phase between said first and second cyclic signals and operative in response to a

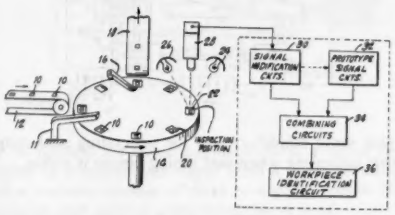
change in said output signal to activate said warning device.

4,072,928

INDUSTRIAL SYSTEM FOR INSPECTING AND IDENTIFYING WORKPIECES

Joseph Wilder, Princeton, N.J., assignor to Sangamo Weston, Inc., Springfield, Ill.

Filed Oct. 10, 1975, Ser. No. 621,638
Int. Cl.[2] G06K 9/00
U.S. Cl. 340—146.3 H **46 Claims**



1. A method of inspecting articles comprising the steps of:
detecting optoelectrically each article to derive an electrical signal and including a component for each point of a multpoint array which overlaps the article;
combining successive components of the electrical signal to derive a quantized signal which identifies selected characteristics of the electrical signal but is substantially different from the electrical signal;
transforming the quantized signal to derive selected components only of a multicomponent transformed signal, each of the transformed signal components being a combination of a selected multiplicity of components of the quantized signal, and forming said selected components of the transformed signal into an extracted signal representing selected features only of the article, said selected features emphasizing more of the lower than of the higher resolution characteristics of the article;
providing a plurality of prototype signals corresponding to similarly derived selected features of a plurality of sample articles; and
combining the extracted signal with the prototype signals to detect correspondence therebetween.

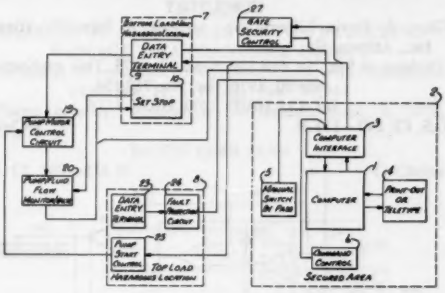
4,072,929

COMPUTER CONTROLLED BULK STORAGE FLUID DISPENSING TERMINAL

Victor H. Garmong, Kennerdell, Pa., assignor to George Edwin Wolfe, Kennerdell, Pa.

Filed Feb. 23, 1976, Ser. No. 660,361
Int. Cl.[2] H04Q 5/00
U.S. Cl. 340—147 A **7 Claims**

1. A computer controlled bulk storage fluid dispensing terminal comprising at least one vehicle fluid loading station, an electronic computer housed within a secured area and having memory means programmed to permit dispensing of allocated types and quantities of fluid to authorized customers, multiple digit input data entry means positioned at each of said at least one loading station and connected to said computer for coded customer identification data entry by hand manipulation of the multiple digit input, indication means connected to said computer to indicate to the operator upon command from said computer that he has been recognized by said computer as an authorized customer and permit him to proceed to fill a vehicle with an allocated quantity and type of fluid at the selected station, means at each of said at least one station and connected to said computer to pump the selected quantity of the allocated amount and type of fluid from a bulk storage into a vehicle at the selected station only after said indication means indicates valid customer recognition by said computer, printout means connected to said computer to automatically print out fluid dispensing information after completion of the dispensing operation, and including command control means housed within said secured area and connected to said computer for data entry, said command control means including a hand



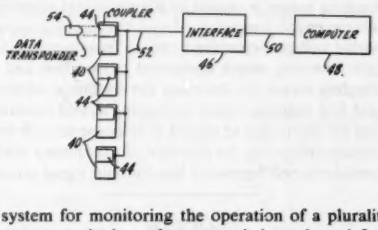
manipulated multiple digit input for entry into said computer of a multiple digit code to bring into function a corresponding question and answer computer programming routine on said printout means to change the data with which the basic program of said computer works while preventing the capability of changing the basic program itself.

4,072,930

MONITORING SYSTEM FOR USE WITH AMUSEMENT GAME DEVICES

Andres R. Lucero, Reno, Nev.; Roy E. Gilbert, Diamond Bar, and Jack H. Stevens, South Pasadena, both of Calif., assignors to Bally Manufacturing Corporation, Chicago, Ill.

Continuation of Ser. No. 505,782, Sept. 13, 1974, abandoned.
This application Aug. 20, 1976, Ser. No. 716,102
Int. Cl.[2] G06K 5/02; G06F 7/00; H04Q 9/00
U.S. Cl. 340—152 T **19 Claims**



1. A system for monitoring the operation of a plurality of amusement game devices, the system being adapted for use with a computer and comprising the combination:
coupler means associated with and electrically connected to each of said devices being monitored, said coupler means being adapted to generate electrical signals indicating the identity of the machine to which it is associated and the identity of predetermined winning conditions,
interface means electrically connected to each of said coupler means and adapted to selectively communicate with the computer and with said coupler means and transponder means, said interface means sequentially generating address identification signals for polling individual portable transponder units,
at least one portable transponder means adapted to communicate with said interface means and with one of said coupler means when connected thereto, said transponder means responding to its unique address identification signal when connected to one of said coupler means by transmitting information to the interface means and the computer concerning the game device identification and,

transponder means identification, predetermined winning condition identification of the game device.

4,072,931

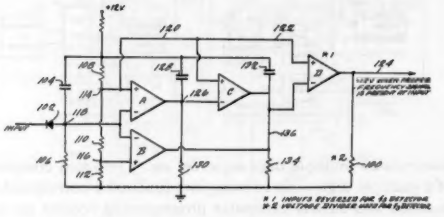
RADIO FREQUENCY ALARM SYSTEM INCLUDING TRANSMITTING, CODING AND DECODING CIRCUITRY

Glenn A. Davis, Lilburn, Ga., assignor to Scientific-Atlanta, Inc., Atlanta, Ga.

Division of Ser. No. 618,239, Sept. 30, 1975. This application July 30, 1976, Ser. No. 710,154

Int. Cl.[2] H03D *3/00;* **H03K** *1/16*

U.S. Cl. 340—171 R **9 Claims**



1. A frequency detector for detecting the occurrence of a predetermined chosen band of frequencies in an electrical signal component which includes a train of relatively short pulses which may occur at a frequency or repetition rate above, below or within said band of frequencies, said frequency detector comprising:

first and second toggling means connected to receive said signal component and to toggle between two output states at the repetition rate of said short pulses and as a function at the frequency of said one signal component wherein both of said toggling means are caused to toggle or not to toggle at said repetition rate whenever the frequency of said signal component is above or below said predetermined chosen frequency band and wherein only said first toggling means is caused to toggle at said repetition rate whenever the frequency of said one signal component is within said predetermined chosen frequency band, and

toggle detecting means connected to said first and second toggling means for detecting the condition wherein only said first toggling means is toggling at said repetition rate and for producing an output in response to such detection thereby indicating the presence of a frequency within said predetermined frequency band in said signal component.

4,072,932

CLOCK GENERATOR FOR SEMICONDUCTOR MEMORY

Norihisa Kitagawa, and Lionel Stuart White, Jr., both of Houston, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 23, 1976, Ser. No. 716,907

Int. Cl.[2] G11C *11/40;* **H03K** *17/00*

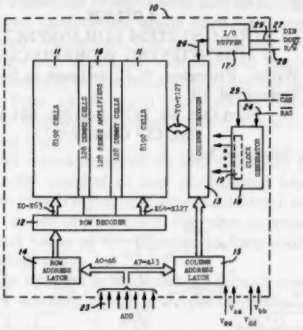
U.S. Cl. 365—233 **12 Claims**

1. A semiconductor memory comprised of:

a. an array of memory cell means for storing binary information,

b. a plurality of sense amplifier means coupled to said array of memory cell means for reading selectable portions of said memory information in response to control signals, and

c. read-clock generator means for generating output signals indicating when said plurality of sense amplifier means has stabilized during said reading wherein said generator means includes timing circuit means having inputs coupled to receive said control signals and having substantially the same architecture as said sense amplifier means for simulating during said reading the transient operation



of said sense amplifiers and for generating said output signals indicating when said timing circuit is stable.

4,072,933

FIRE HEAT DETECTOR AND/OR BURGLAR ALARM

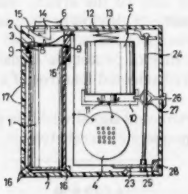
Kwok-Wah Pun, Kowloon, Hong Kong, assignor to Cheung King Fung, Kowloon, Hong Kong

Filed Dec. 30, 1975, Ser. No. 645,439

Claims priority, application United Kingdom, Jan. 6, 1975, 369/75

Int. Cl.[2] G08B *17/04*

U.S. Cl. 340—229 **15 Claims**

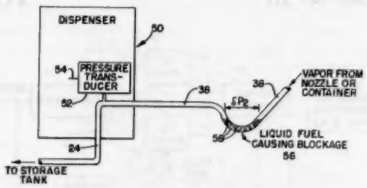


1. A detecting device comprising a thermally conductive container having an open end, a resilient diaphragm mounted across the open end to close the container and for expansion in response to pressure changes in the container corresponding to variation of temperature externally of the container, said diaphragm having an outer peripheral portion in close-fit non-hermetic sealing engagement with the peripheral surface of the container at its open end to form an annular venting passageway between said surface and the peripheral portion of the diaphragm, the open end of the container terminating in a circumferential rim which is provided with an annular protruding lip for engagement with said outer peripheral portion of the diaphragm, and indicating means responsive to expanding movements of said diaphragm for translating the movements into audible sound, said indicating means comprising a conductive plate member mounted for actuation by expanding movements of said diaphragm, a buzzer connected at one end to said conductive plate and at another end to an electrical power supply mounted vicinal to said container and said buzzer, and a switch for connecting said conductive plate to the electrical power supply to actuate the buzzer.

4,072,934
METHOD AND APPARATUS FOR DETECTING A BLOCKAGE IN A VAPOR FLOW LINE

Trueman W. Hiller, Bettendorf, and David C. Hamstra, Clinton, both of Iowa, assignors to Wylain, Inc., Dallas, Tex.

Filed Jan. 19, 1977, Ser. No. 760,716
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—243 24 Claims



1. A method for detecting blockage in a vapor flow line adapted to communicate vapor from a container adapted to hold a variable amount of fluid to a point remote from the container, said method comprising the steps of:

obtaining a first signal representative of the pressure in the vapor flow line;

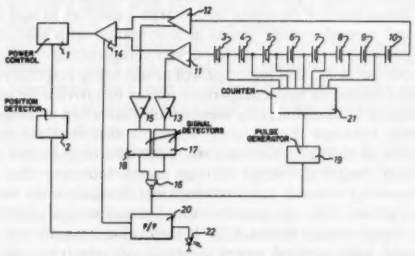
producing a second signal representative of the rate of change with time of said first signal; and

detecting if the frequency of the variations in said second signal exceeds a first preset limit to detect a blockage in the vapor flow line.

4,072,935
APPARATUS FOR INDICATING WHETHER ONE OR MORE OBJECTS ARE IN MOTION

Sten-Åke Olaus Rydborn, Kloxhultsvagen 21, 343 00 Almhult, Sweden

Filed May 4, 1976, Ser. No. 683,146
Claims priority, application Sweden, May 5, 1975, 7505161
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—259 6 Claims

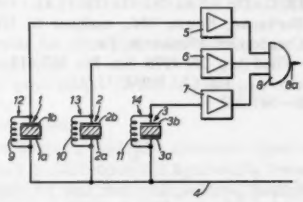


1. Apparatus for indicating whether one or more objects, for example, threads, strips or the like, are in motion, said apparatus including a plurality of signal generating means, one signal generating means associated with each object to be detected, each signal generating means generating an electric signal upon detection of movement of its associated object; means connecting said plurality of signal generating means together in a series circuit; a first signal amplifier coupled to the first end of said series circuit; a second signal amplifier coupled to the second end of said series circuit; a coupling device connected to said connecting means to successively ground the connections between the signal generating means in said series circuit; first gate means having a first input connected to the output of said first signal amplifier, a second input connected to the output of said second signal amplifier, and an output connected to said coupling device, said first gate means interrupting the successive grounding of the connections between the signal generating means upon simultaneous receipt of a signal at both inputs of said first gate means, which indicates a signal from at least one signal-generating means on each side of the grounded connection.

4,072,936
METHOD OF AND APPARATUS FOR DETECTING DAMAGE TO A FRANGIBLE OBJECT

Ernst Spirig, Movenstrasse 37, CH-8640 Rapperswil, Switzerland

Filed Feb. 11, 1977, Ser. No. 767,941
Claims priority, application Switzerland, Sept. 9, 1976, 11466/76
Int. Cl.[2] G08B *13/04*
U.S. Cl. 340—274 R 12 Claims

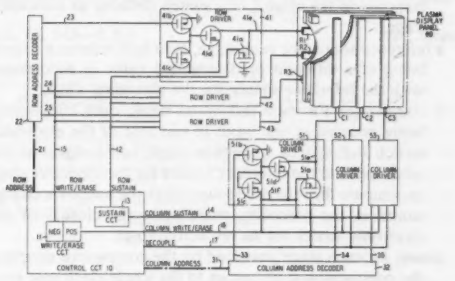


4. Apparatus for detecting breakage of a frangible object, comprising a plurality of ultrasonic transducers coupled to said object to respond to ultrasonic vibrations in different respective frequency ranges occurring therein, circuit means yielding a breakage-denotive output signal in response to the simultaneous application of signals to a plurality of inputs thereof and means applying the signal from each said transducer to a respective input of said circuit means whereby said breakage-denotive output signal is developed.

4,072,937
MOS TRANSISTOR DRIVER CIRCUITS FOR PLASMA PANELS AND SIMILAR MATRIX DISPLAY DEVICES

William Wing-Yen Chu, Matawan, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 15, 1976, Ser. No. 649,239
Int. Cl.[2] G06F *3/14*
U.S. Cl. 340—324 M 10 Claims



1. Driver circuitry for extending signals to first and second coordinate conductors associated with a predetermined cell of a matrix display device comprising

first and second MOS transistors each comprised of a first conductivity type semiconductor layer and second conductivity type drain and source regions disposed in said layer and defining a channel region therein,

means for connecting the drain regions of said first and second transistors to said first and second conductors, respectively, and

means for concurrently coupling respective signals at first and second potentials to the source region of said first transistor and the semiconductor layer of said second

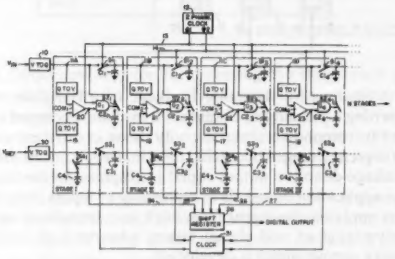
transistor, respectively, and for thereafter concurrently coupling said signals to the source region of said second transistor and the semiconductor layer of said first transistor, respectively.

4,072,938

BUCKET BRIGADE ANALOG-TO-DIGITAL CONVERTER

James E. Buchanan, Bowie, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 25, 1975, Ser. No. 607,413
Int. Cl.[2] H03K *13/17*
U.S. Cl. 340—347 AD 12 Claims



1. An analog-to-digital converter for providing a binary output indicative of an analog input at precise repetitive time intervals, comprising:

a plurality of series connected electronic switches, each switch defining an individual stage of successive converter stages,

a single electronic storage device for each individual stage, each device being coupled to store an unknown charge in response to the closing of a switch defining its associated stage,

a reference source for each stage, each said reference source being of a different predetermined value in accordance with the reference source for the preceding stage,

a comparator for each individual stage, each comparator being coupled at one input to one side of the electronic switch defining its respective stage and coupled at the other input to the reference source for its respective stage to compare the reference source with the unknown charge stored in the preceding stage upon the closure of the electronic switch for its respective stage,

means for each stage governed by the comparator coupling the comparator at its output to the single electronic storage device of the stage at times when the electronic switch for such stage is closed, to either store the entire charge of the storage device of the preceding stage or a charge equivalent to the reference source for the associated stage,

a parallel to serial shift register,

means coupling the shift register to each one of the stages to receive a binary value from each stage upon the closure of an associated electronic switch in accordance with the output of the comparator for each stage, and

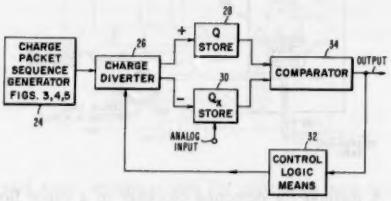
clock means coupled to each of the electronic switches operative to close and open the electronic switches of alternate stages to transfer the charge from one stage to the next at precise times.

4,072,939

ANALOG-TO-DIGITAL AND DIGITAL-TO-ANALOG CONVERTER CIRCUITS EMPLOYING CHARGE REDISTRIBUTION

Lawrence Griffith Heller, Brewster, and Lewis Madison Terman, South Salem, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 1, 1976, Ser. No. 662,626
Int. Cl.[2] H03K *13/03*
U.S. Cl. 340—347 AD 4 Claims



1. An analog-to-digital converter circuit of the type employing successive approximation binary search techniques comprising:

a source of analog input signal,

a sequence generating circuit for generating a binarily decreasing sequence of electrical charge quantities of the form $Q = Q_R/2, Q_R/4, Q_R/8$ up to $Q_R/2^N$ where Q_R is a predetermined quantity of electrical charge and N is a positive integer,

a first storage means for sequentially accumulating a first plurality of first selected ones of said charge quantities from said sequence of electrical charge quantities.

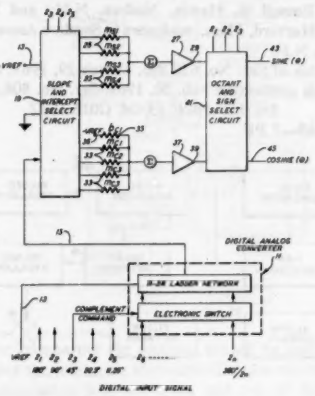
a second storage means for storing said input analog signal and for sequentially accumulating and adding to said analog signal a second plurality of other selected ones of said charge quantities from said sequence of electrical charge quantities,

and means including an electrical charge diverting means, a comparator circuit and a logic control means connected to said sequence generating circuit, and said first and second storage means for sequentially comparing said accumulated charge quantities in said first and second storage means and for directing said charge quantities to said first and second storage means in accordance with said comparisons to produce an output signal representative of said comparisons, said logic control means being responsive to the output of said comparison means to provide an input signal to said diverting means such that when a comparison between the quantity stored in said first electrical charge storage means and the quantity stored in said second electrical charge storage means indicates that the quantity stored in said first electrical charge storage means is greater than the quantity stored in said second electrical charge storage means, a "0" binary value is manifested and said logic control means controls said electrical charge diverting means to direct the next successive one of said binarily decreasing sequence of electrical charge quantities to said second electrical charge storage means for addition to the quantity stored therein, and that when a comparison between the quantities stored in said first and second electrical charge storage means indicates that the quantity stored in said second electrical charge storage means is greater than the quantity stored in said first electrical charge storage means, a "1" binary value is manifested and said logic control means controls said electrical charge diverting means to direct the next successive one of said binarily decreasing sequence of electrical charge quantities to said first electrical charge storage means for addition to the quantity stored therein, said comparison, diverting and storage operations continuing for N occurrences, where N is said positive integer, to provide an N bit digital signal representative of said input analog signal.

4,072,940
DIGITAL TO ANALOG RESOLVER CONVERTER

David Julian Simon, Saddle Brook, and Edward Charles Costello, Paterson, both of N.J., assignors to The Singer Company, Little Falls, N.J.

Filed June 1, 1976, Ser. No. 691,272
Int. Cl.[2] H03K *13/02*
U.S. Cl. 340—347 SY 10 Claims



1. In a method utilizing electronic circuitry for converting an m bit digital voltage signal representing an angle over an octant which is a portion of an n bit digital voltage signal representing an angle from 0° to 360° into an analog voltage signal representing a continuous periodic function of the angle to be used as an output of a digital to analog resolver converter comprising:

a. dividing the continuous periodic function of the angle into an even number p of equal angular segment each segment having a slope with the same sign over the full segment where $\log_2 p$ is a non-negative integer;

b. determining and storing average slope and intercept information of each slope segment in electronic circuitry;

c. converting the r least significant bits of the digital signal into an analog value in a digital to analog converter where $r = m - \log_2 p$;

d. selecting in said electronic circuitry slope and intercept values in accordance with the remaining $\log_2 p$ bits of the m bit digital voltage signal and the $(m-1)$ th bit; and

e. carrying out multiplication of the converted analog value by a selected slope and addition of selected intercept values in electronic circuitry, the improvement comprising;

f. determining and storing in said electronic circuitry, as a first intercept, the intercept of a line segment subtending one of said angular segments;

g. determining and storing the slopes of line segments subtending each of said angular segments in said electronic circuitry;

h. selecting one of the slopes as the slope multiplier in accordance with the remaining $\log_2 p$ bits in said electronic circuitry;

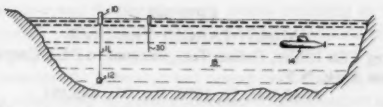
i. determining a partial intercept value in said electronic circuitry; and

j. multiplying the analog value by the selected slope multiplier and adding to the results the partial intercept value and the first intercept in said electronic circuitry.

4,072,941
UNDERWATER MONITORING

Michael A. Hamid, Winnipeg, and Oscar A. Sandoz, Ottawa, both of Canada, assignors to The Minister of National Defence of Her Majesty's Canadian Government, Ottawa, Canada

Filed July 15, 1976, Ser. No. 705,493
Claims priority, application Canada, July 17, 1975, 231687
Int. Cl.[2] G01S *9/02*
U.S. Cl. 343—5 NA 9 Claims



1. Apparatus for detecting the presence of an underwater object, comprising:

means for generating a first electrical signal of varying frequency;

a monopole antenna;

means for applying said first electrical signal of varying frequency to said monopole antenna for transmission of said signal by said monopole antenna as an electromagnetic signal propagated through a body of water to said object;

said means for applying also receiving reflections of said electromagnetic signal sensed by said monopole antenna and providing a sound electrical signal corresponding to said reflections;

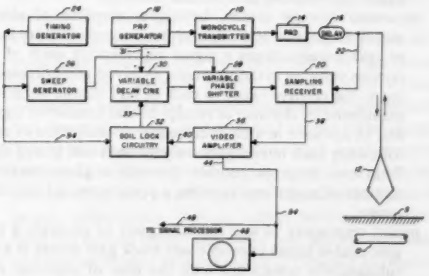
means for comparing said first and second electrical signals to provide an output signal corresponding to variation in the input impedance of said monopole antenna; and

means for indicating said output signal.

4,072,942
APPARATUS FOR THE DETECTION OF BURIED OBJECTS

Anthony V. Alongi, Niagara Falls, N.Y., assignor to Calspan Corporation, Buffalo, N.Y.

Continuation of Ser. No. 659,883, Feb. 20, 1976, abandoned, which is a continuation of Ser. No. 504,571, Sept. 9, 1974, abandoned. This application Nov. 11, 1976, Ser. No. 741,312
Int. Cl.[2] G01S *9/02*
U.S. Cl. 343—5 NA 18 Claims



1. Apparatus for detecting objects buried below the surface of the earth, comprising:

(a) transmitter means for generating short, monocycle pulses of signals,

(b) antenna means spaced from and movable over said surface for radiating said signals to and receiving reflections from said surface, said reflections comprising a plurality of signals spaced in time each of which having a characteristic waveshape,

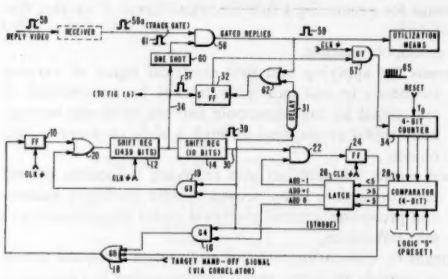
(c) receiver means connected to said antenna means for generating an output signal in response to said reflections,
(d) soil lock circuit means responsive to the receiver means output signal for detecting the center of a symmetrical waveshape comprised within said reflections which represents the signal reflected from the surface of the earth, said soil lock circuit means developing as an output an error signal, and
(e) means for controlling said receiver means in response to said error signal.

4,072,943

MULTI-TARGET TRACKER

Jeffrey Ellis Miller, Dallas, Tex., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,481
Claims priority, application United Kingdom, Apr. 14, 1975, 15220/75
Int. Cl.[2] G01S 9/56
U.S. Cl. 343—6.5 LC **3 Claims**



1. In a radar tracking system of the transponder type wherein reply signals from one or more remote stations are respectively responsive to interrogation signals having a predetermined repetition rate during a selected period, said period being defined by a predetermined number of said interrogation signals, said system including correlator means including means for generating said interrogation signals, and for correlating replies thereto to identify remote stations and to provide, only during a preselected period prior to said selected period, a hand-over signal representing each of such remote stations,

a tracker for tracking said reply signals comprising:

track gate means normally disabled responsive when enabled to said reply signals from remote vehicles respondng to said interrogation signals to generate a digital reply signal representing said remote vehicle;

sequential storage means, having a plurality of storage stages, responsive to said hand-over signals to store in one of said storage stages a signal representing each of said remote vehicles in the sequence received and corresponding to the relative range to each of said remote vehicles as manifested by the time of receipt of said hand-over signals, and to advance in a clocked sequence indicative of range following each interrogation signal each said stored signal from one stage to another through a given maximum number of stages representing a predetermined maximum range;

means responsive to said stored signals to generate a track gate enable signal to enable said track gate means at a time substantially coincident with the time of expected reply for each of said remote vehicle reply signals; and

servo means further responsive to said stored signals and to said reply signals to generate control signals to servo sequential movement of said stored signals in said storage means such that the relative storage stage of said stored signal is changed to reduce errors of coincidence in the expected reply signal and said track gate enable signal;

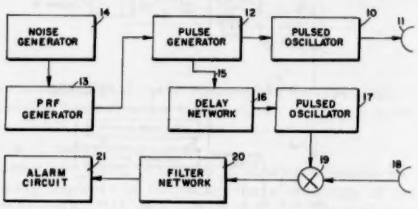
said sequential storage means being a shift register clocked at a predetermined rate and having a plurality of stages, including an input and output stage, each stage in sequence corresponding to an increment of range, whereby a plurality of digital reply signals are stored simultaneously in a sequence and location corresponding to the range of each of said remote vehicles, and said track gate enable signal is generated at said output stage of said shift register and coupled to said track gate means.

4,072,944

IMMINENT COLLISION DETECTION APPARATUS

Joseph F. Bianco, Wakefield; Nicholas Senio, Bedford, both of Mass.; Russell B. Hawes, Nashua, N.H., and Donald B. Strang, Harvard, Mass., assignors to Sanders Associates, Inc., Nashua, N.H.

Continuation of Ser. No. 628,805, March 29, 1967, abandoned. This application Feb. 20, 1969, Ser. No. 808,034
Int. Cl.[2] F42C 13/04; G01S 9/42
U.S. Cl. 343—7 PF **12 Claims**



11. A method for detecting imminent collision of a first object with a second object, comprising the steps of:

transmitting a pulsed energy signal having a predetermined starting phase;

receiving an echo of said pulsed energy signal from said second object;

separately generating a pulsed energy reference signal coherent to said transmitted signals said reference signal having the same starting phase as said transmitted signal; and

mixing said reference and received signals for producing a doppler signal.

4,072,945

RADAR-OPERATED COLLISION AVOIDANCE SYSTEM FOR ROADWAY VEHICLES USING STORED INFORMATION FOR DETERMINATION OF VALID OBJECTS

Masaaki Katsumata, and Norio Fujiki, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Dec. 2, 1976, Ser. No. 746,742
Claims priority, application Japan, Dec. 2, 1975, 50-142376
Int. Cl.[2] G01S 9/02; B60T 17/18
U.S. Cl. 343—7 VM **5 Claims**

4. A collision avoidance system for a roadway vehicle having a steering wheel, including a radar device for sensing the distance from the vehicle to an object and the speed of the vehicle relative to said object, a decision making circuit responsive to said sensed distance and said sensed relative speed to determine when the vehicle is approaching the object at a dangerously high speed, and a utilization circuit responsive to an output from said decision making circuit, wherein the improvement comprises:

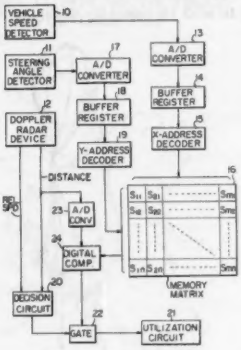
means for detecting the speed of the vehicle relative to roadway;

means for detecting the magnitude of angular movement of said steering wheel;

a plurality of memory matrices each storing information representing a minimum allowable distance from said

vehicle to said object for a particular set of input variables within an array of rows and columns;

means for selectively reading the stored information from one of said memory matrices in response to said detected vehicle speed and to said detected magnitude of angular movement of said steering wheel as a set of said input variables;



means for comparing the distance sensed by said radar device and the minimum allowable distance represented by the information read out from said one of the memory matrices to generate an inhibit signal when said sensed distance is greater than said allowable distance; and

means for disabling said output signal from said decision making circuit in response to said inhibit signal.

4,072,946

METHOD AND APPARATUS FOR MEASURING THE DISTANCE BETWEEN TWO STATIONS

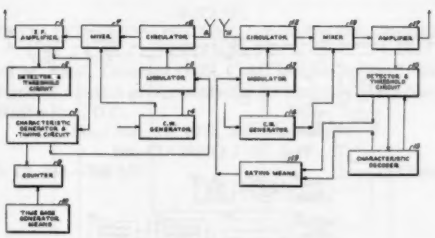
Wim Bernard Samuel Maria Kneefel, Koningin Astrid Boulevard 56, Noordwijk, Netherlands

Continuation of Ser. No. 397,518, Sept. 17, 1973, abandoned. This application Aug. 6, 1976, Ser. No. 712,053

Claims priority, application Netherlands, Sept. 26, 1972, 7212991

Int. Cl.[2] G01S *9/08, 9/56*

U.S. Cl. 343—12 R **1 Claim**



1. Apparatus for measuring the distance between two continuous data link stations at least one of which is movable, comprising:

a. a first carrier wave generator at said first station and including an input terminal for receiving the data to be transferred, and first and second output terminals,

b. a first modulator having first and second input terminals and an output terminal, said first input terminal being connected with said first output terminal of said first carrier wave generator,

c. a first antenna at said first station,

d. first circulator means connected with said first antenna and including an input terminal connected with the output terminal of said first modulator, and an output terminal,

e. a first mixer having a first input terminal connected with the output terminal of the first circulator means, a second input terminal connected with the second output terminal of the first carrier wave generator, and an output terminal,

f. an IF amplifier including an input terminal connected with the output terminal of said first mixer, and first, second and third output terminals,

g. detector and threshold circuit means including an input terminal connected with the first output terminal of said IF amplifier, and an output terminal,

h. characteristic generator and timing circuit means including a first input terminal connected with the output terminal of said detector and threshold circuit means, a second input terminal connected with the second output terminal of said IF amplifier, and a first output terminal connected with the second input terminal of said first modulator,

i. counter means having a first input terminal connected with the second output terminal of said characteristic generator and timing circuit, and second input terminal,

j. time base generator means connected with the second input terminal of said counter means,

k. a second carrier wave generator at said second station and including a data input terminal and first and second output terminals,

l. a second modulator having a first input terminal connected with the first output terminal of said carrier wave generator, a second input terminal, and an output terminal,

m. a second antenna at said second station,

n. second circulator means connecting the output terminal of said second modulator with said second antenna, said second circulator means including an output terminal,

o. a second mixer including a first input terminal connected with the output terminal of said second circulator means, a second input terminal connected with the second output terminal of said second carrier wave generator, and an output terminal,

p. a second IF amplifier having an input terminal connected with the output terminal of said second mixer, and first and second output terminals,

q. a second detector and threshold circuit having a first input terminal connected with the first output terminal of said second IF amplifier, a second input terminal, and first and second output terminals,

r. characteristic decoder means including an input terminal connected with the first output terminal of said second detector and threshold circuit, a first output terminal connected with the second input terminal of said detector and threshold circuit, and a second output terminal, and

s. gating means including first and second input terminals connected with the second output terminals of said detector and threshold circuit and said characteristic decoder means, respectively, and an output terminal connected with the second input terminal of said second modulator,

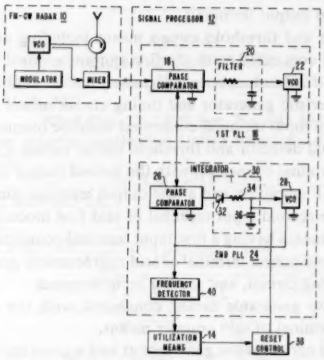
t. said first modulator being operable to produce an interruption in the carrier wave generated by said first carrier wave generator and also a characteristic signal which occurs prior to the interruption, and

u. the characteristic decoder and said second detector and threshold circuit being operable to detect said interruption and to introduce a corresponding interruption in the carrier wave of said second carrier wave generator, which second interruption is detected in said first detector and threshold circuit to afford a measure of the distance between said stations.

4,072,947
MONOTONICALLY RANGING FM-CW RADAR SIGNAL PROCESSOR

Henry Charles Johnson, Neshanic, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 11, 1976, Ser. No. 741,068
Int. Cl.[2] G01S 9/24
U.S. Cl. 343—14 4 Claims



1. In a continuous wave radar ranging system of the type wherein a signal is transmitted in the direction of a target and is reflected from said target back to the source of said transmitted signal, the range of said target from said ranging system varying monotonically, said transmitted signal being frequency modulated in accordance with a given periodic waveform, said ranging system including means for deriving from said transmitted signal and said reflected signal a difference signal indicative of the frequency difference of said reflected signal from the instantaneous frequency of said transmitted signal, and signal processor means, responsive to said difference signal, for generating an output signal indicative of the range of said target; the improvement wherein said signal processor comprises:

first frequency tracking means, responsive to said difference signal, for generating an output signal having continuous phase velocity at a frequency indicative of said difference frequency; and

second frequency tracking means, responsive to said first frequency tracking means output signal, for generating an output signal indicative of the value of a predetermined frequency extremum attained by said difference signal, said second frequency tracking means output signal being indicative of said range.

4,072,948
LIGHT WEIGHT RADAR REFLECTOR

William A. Drews, Bethesda, Md.; Charles L. Padgett, Alexandria, and Ray Anthony Pinna, Woodbridge, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 24, 1977, Ser. No. 761,553
Int. Cl.[2] H01Q 15/18
U.S. Cl. 343—18 C 4 Claims

1. A lightweight radar reflector employed beneath a weather balloon to aid in radar tracking of a sonde comprising:

an array of eight trihedral corner reflectors;

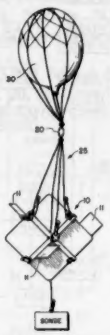
a lanyard swivel suspension system permitting said array to swivel freely; and wherein said

array of eight trihedral corner reflectors comprises:

a 1st precut panel of reflective material having a high stiffness to weight ratio in the shape of a square and having four identical slots extending from the midpoint of each edge toward the center of said panel about one-fifth the distance thereof;

a 2nd precut panel of said material of the same size and including a slot which extends from the center of said 2nd panel for a distance of about four-fifths thereof toward the midpoint of the edges of said 2nd panel along the center line, and further including a crease line along the orthogonal center line of said 2nd panel for enabling folding of said 2nd panel to an angle of about ninety degrees;

a 3rd precut panel identical to said 2nd panel, wherein said 2nd and 3rd panels are foldably affixed in a symmetrical fashion to said 1st panel by engagement of said slots;



a plurality of cross shaped clips for fastening said precut panels at the six intersection points inherent in said array;

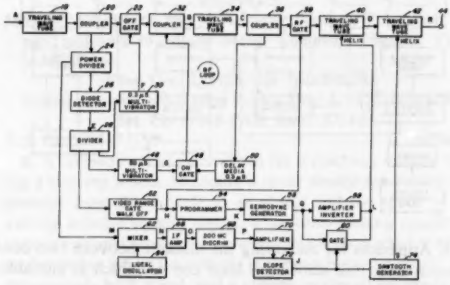
a plurality of eyeletted lanyard passages placed so that said array will be oriented to aim said corner reflectors into the eight quadrants of a three-dimensional coordinate system aligned vertically when fastened to a lanyard assembly; and

at least three spin vanes attached to said array in a symmetrical fashion to produce a spin torque when said array ascends.

4,072,949
RANGE GATE WALK-OFF OF COMPRESSIVE RADAR

LeRoy B. Van Brunt, Fairfax, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 17, 1970, Ser. No. 20,440
Int. Cl.[2] G01S 7/38; H04K 3/00
U.S. Cl. 343—18 E 7 Claims



1. A range gate walk off device to be used as a countermeasure to radar reception, comprising:

input terminal means for receiving enemy radar signals;

a plurality of traveling wave tubes connected in series to receive, modify and amplify the signals;

delay means and gating means connected in series with each other and in parallel with one of the traveling wave tubes to comprise an RF memory loop;

detection means, connected to the gating means, for detect-

ing the received signals and opening the gating means when a signal is received; and

output terminal means for transferring the modified signal to another device.

4,072,950

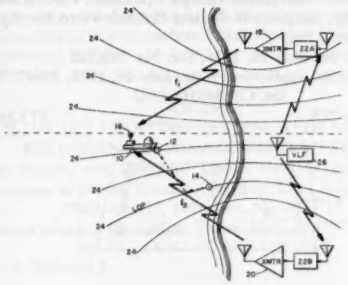
LF/MF NAVIGATION SYSTEM

Eric R. Swanson, 640 Silvergate Ave., San Diego, Calif. 92106

Filed Sept. 13, 1976, Ser. No. 722,456

Int. Cl.[2] G01S *1/30*

U.S. Cl. 343—105 R **12 Claims**



1. Apparatus for a navigation system employing a hyperbolic phase grid, said apparatus comprising:

a. means for transmitting a plurality of signals having different frequencies in the LF/MF range each of said signals being transmitted from a different and known location;

b. receiver indicator means receiving a first and a second of said transmitted signals for translating said first signal from its transmitted frequency to a first frequency comprising the sum of a common frequency and a first residual frequency error, for translating said second signal from its transmitted frequency to a second frequency comprising the sum of said common frequency and a second residual frequency error, and for indicating the phase difference between said first and second signals, the quotient of the absolute value of the difference between said first residual frequency error and said second residual frequency error and said common frequency not exceeding a selected limit.

4,072,951

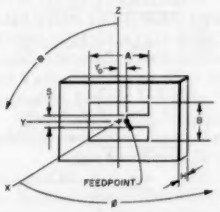
NOTCH FED TWIN ELECTRIC MICRO-STRIP DIPOLE ANTENNAS

Cyril M. Kaloi, Thousand Oaks, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 10, 1976, Ser. No. 740,690

Int. Cl.[2] H01Q *1/38, 1/48*

U.S. Cl. 343—700 MS **20 Claims**



1. A notched fed twin electric microstrip dipole antenna structure, comprising:

a. a dielectric substrate;

b. a twin pair of thin rectangular radiating elements disposed one each on opposite sides of said dielectric substrate which electrically separates the twin radiating elements;

c. the radiating element on one side of said dielectric substrate being directly opposite to and the mirror image of the radiating element on the other side of said dielectric substrate;

d. each of said twiin radiating elements being operable to be excited to radiate in a microstrip mode, and each of said twin radiating elements acting as a ground plane for the other;

e. the broadside fields of each of the antenna twin radiating elements being excited in identical modes of oscillation, radiating independently of each other with respective fields on opposite sides of the dielectric substrate being 180° out of phase with one another;

f. said twin radiating elements each having a feed point located along the centerline of the length thereof; said feed points being directly opposite to each other;

g. said twin radiating elements each having a notch extending into the element along the centerline of the length from one end thereof to said feed point;

h. the length of said twin radiating elements determining the resonant frequency of the antenna;

i. the antenna input impedance being variable to match most practical impedances as said feed points are moved along the element centerline without affecting the antenna radiation pattern;

j. the antenna bandwidth being variable with the width of the twin radiating elements and the spacing between said twin radiating elements, the width of the notch being a factor as to the effective width of said twin elements, said spacing between the twin radiating elements having somewhat greater effect on the bandwidth than the width of the elements.

4,072,952

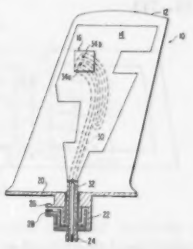
MICROWAVE LANDING SYSTEM ANTENNA

Paul S. Demko, Bricktown, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 4, 1976, Ser. No. 729,431

Int. Cl.[2] H01Q *1/28, 1/38*

U.S. Cl. 343—700 MS **11 Claims**



1. An antenna configuration for aircraft having a VHF/UHF antenna means enclosed within a dielectric radome which has an airfoil configuration attached to a base, the VHF/UHF antenna means being a blade type comprising a pair of like planar radiator elements located on opposite faces of a planar dielectric member, said base being adapted for mounting on the aircraft and acting as a ground plane, and having a VHF/UHF antenna and communications apparatus within the aircraft, the improvement comprising:

microwave antenna means for the Microwave Landing System comprising a pair of like microwave antenna elements located within said radome outside opposite faces of said dielectric member, a microwave signal feed point in

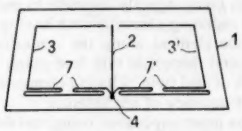
said base, microwave feed means disposed interiorly of said radome coupling the microwave signal feed point to the microwave antenna elements, with the microwave feed means including phasing means to feed the microwave antenna elements in a desired phase relation, the phase relation and the location of the microwave antenna elements being that which produces a desired omnidirectional pattern as required for the Microwave Landing System.

4,072,953

MULTIBAND ANTENNA FOR WINDOW PANES

Mauro Comastri, Monza, and Giorgio Ciarniello, Vasto (Chieti), both of Italy, assignors to Societa Italiana Vetro Siv S.p.A., Vasto, Italy

Filed Aug. 6, 1976, Ser. No. 712,342
Int. Cl.² H01Q *1/32*
U.S. Cl. 343—713 **6 Claims**



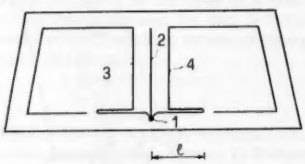
1. A multiband antenna for window panes, the antenna comprising a fishpole-type antenna component and a frame-type antenna component having a common terminal, at least one leg of said frame-type antenna component bordering one window rim and including a succession of series-connected horizontally directed S-shaped loops in a single conductor adjacent said one window rim, each said S-shaped loop having a length corresponding to an uneven multiple of a quarter wave length corresponding to the central frequency of the metric wave band.

4,072,954

MULTIBAND ANTENNA FOR WINDOW PANES

Mauro Comastri, Monza, and Giorgio Ciarniello, Vasto (Chieti), both of Italy, assignors to Societa Italiana Vetro Siv S.p.A., Vasto (Chieti), Italy

Filed July 26, 1976, Ser. No. 708,760
Claims priority, application Italy, July 24, 1975, 50650/75
Int. Cl.² H01Q *1/32*
U.S. Cl. 343—713 **11 Claims**



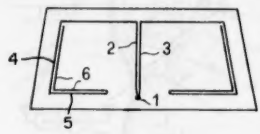
1. In a multi-band windshield or window antenna having a fishpole-type conductor for metric wave band signal reception and having a free upper end portion extendng to a given level, and at least one conductor running along in close vicinity to a periphery of the windshield or windowpane for the reception of medium wave band signals, all conductors conjoining at a common terminal located adjacently to a first rim of the windshield or window, the improvement wherein each conductor for medium wave signals extends in a generally horizontal direction from said common terminal for a distance adjacent said first rim, then doubles back on itself to form a first loop, at the end of which it bends upward into a generally first vertical leg running parallel to and in close vicinity to said fishpole-type conductor, until substantially reaching said given level of said free end portion of said fishpole-type conductor, to bend thereat away from said fishpole-type conductor and run along adjacent to at least a portion of a second rim of said windshield or window, and then bends downwardly and extends toward said first rim, running along adjacent to a third rim of said windshield or window to define a second vertical leg, whereby the at least one conductor for the reception medium wave band signals also participates in picking up of the metric wave band signals and the fishpole-type conductor also participates in picking up of the medium wave band signals.

4,072,955

MULTIBAND ANTENNA FOR WINDOW PANES

Mauro Comastri, Monza, and Giorgio Ciarniello, Vasto (Chieti), both of Italy, assignors to Societa Italiana Vetro Siv S.p.A., Vasto (Chieti), Italy

Filed July 26, 1976, Ser. No. 708,762
Claims priority, application Italy, July 24, 1975, 50647/75
Int. Cl.² H01Q *1/32*
U.S. Cl. 343—713 **17 Claims**



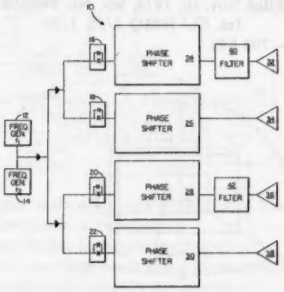
1. A multiband antenna as applied to a window pane, particularly a windshield, for reception of radio signals for a radio receiver having a single antenna input, the antenna comprising: a terminal for connection of the antenna to the receiver; and two conductors electrically connected to said terminal and extending in a generally vertical direction substantially parallel to one another up to a distance a few centimeters from a first rim of said pane, each one of said conductors respectively bending thereafter substantially 90° in opposite directions, so as to define a pair of first legs which extend parallel to said first rim, each one of said conductors being thereafter substantially a second 90° in the vicinity of respective second and third rims of said pane so as to define a pair of second legs, each one of said conductors being respective third and fourth legs running respectively substantially parallel to at least said pair of second legs.

4,072,956

MULTIFREQUENCY ARRAY USING COMMON PHASORS

Joseph H. Provencher, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 17, 1976, Ser. No. 686,855
Int. Cl.² H01Q *3/22*
U.S. Cl. 343—844 **10 Claims**



1. A phased array antenna system comprising:

first means including a plurality of frequency generators for simultaneously outputting a plurality of frequency signals, each said frequency signal being an approximate multiple of the one of said plurality of frequency signals having the lowest frequency;

a plurality of phase shifters connected to the output of said first means, each of said phase shifters being operably coupled to each of said frequency generators and each of said phase shifters introducing a different phase increment in response to each of said plurality of frequency signals;

a plurality of radiating elements each being operably coupled to one of said plurality of phase shifters;

whereby in response to each of said frequency signals, said plurality of radiating elements simultaneously generates a plurality of beams, each said beam having a different beam pointing angle.

4,072,957

NON-IMPACT PRINTING SYSTEM WITH MAGNETIC RECORDING APPARATUS AND METHOD

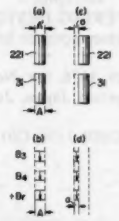
Norio Kokaji, and Toshihiro Urano, both of Tokyo, Japan, assignors to Iwatsu Electric Company, Ltd., Japan

Filed Jan. 22, 1976, Ser. No. 651,227

Claims priority, application Japan, Mar. 13, 1975, 50-30567

Int. Cl.[2] G03G *19/00;* G11B *5/02*

U.S. Cl. 346—74.1 **8 Claims**



1. A method for magnetic recording comprising:

recording a first magnetic latent image of a predetermined width on the surface of a recording medium with a recording head having the predetermined width at a first position,

recording a second magnetic latent image on the surface of the recording medium to overlap only a portion of the first magnetic latent image on the surface of the recording medium with a recording head at a second position displaced from the first position to form a continuous narrowed first magnetic latent image on the surface of the recording medium having a width less than the predetermined width,

rendering visible the portion of the first magnetic latent image not overlapped by the second magnetic latent image.

4,072,958

INK INJECTION TYPE WRITING SYSTEM USING AMPLITUDE-MODULATED ELECTRICAL SIGNALS

Heijiro Hayami; Hiroyoshi Tsuchiya; Kunio Yoshida; Yukifumi Tsuda, and Yoshimitsu Kanno, all of Kawasaki, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

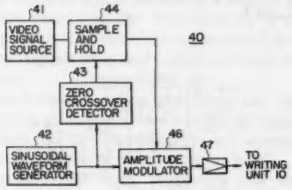
Filed Apr. 2, 1976, Ser. No. 673,132

Claims priority, application Japan, Apr. 11, 1975, 50-44613

Int. Cl.[2] G01G *15/18*

U.S. Cl. 346—140 R **7 Claims**

1. An ink ejection system comprising a writing unit including a chamber, means defining an inlet channel connected in use to a source of liquid for introducing the liquid into the chamber, means defining an outlet channel connected to the chamber, and an electromechanical transducer for generating pressure rises in the liquid in the chamber to discharge the liquid in a series of droplets through the outlet channel onto a surface, means for generating an alternating sinusoidal signal of constant amplitude and frequency higher than the highest instantaneous frequency of a video signal, means for detecting a zero crossover point of said alternating signal, and generating a sampling signal in step with each zero crossover point, sam-



ple-and-hold circuit means effective to sample the instantaneous value of the video signal in response to said sampling signal and to hold the sampled video signal until the next sampling signal occurs, and means for modulating the amplitude of the sinusoidal alternating signal in accordance with the output from the sample-and-hold circuit means.

4,072,959

RECORDER OPERATING WITH DROPS OF LIQUID

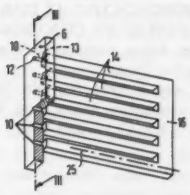
Rune Elmqvist, Bromma, Sweden, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 29, 1976, Ser. No. 681,525

Claims priority, application Germany, June 20, 1975, 2527647

Int. Cl.[2] G01D *15/18;* H01V *7/00*

U.S. Cl. 346—140 R **8 Claims**

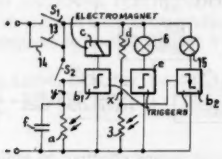


1. A recorder operating with drops of liquid for point-by-point recording of analog curves or alphanumerical characters and of images, comprising in combination, a plurality of nozzles positioned next to one another in rows in a common member for producing the individual points, said nozzles having inlet openings and exit openings contacted piezoelectric transducer positioned in front of said inlet openings and arranged so that as a result of electrical potential variations at the contacts, ink is expelled from the nozzle; recording means to which the expelled ink is applied located in front of the exit openings of the nozzles; said transducers comprising rod-shaped piezoelectric transducers for generating piezoelectric movements, said transducers being arranged in the form of teeth of a comb having base ends commonly joined together with unjoined free end zone of each of the rods assigned to the respective inlet opening of each of the nozzles.

4,072,960
CAMERA WITH BATTERY TESTING DEVICE

Willi Meixner, Bunde, Germany, assignor to Balda-Werke Photographische Gerate und Kunststoff GmbH & Co. KG., Bunde, Germany

Filed Sept. 22, 1975, Ser. No. 615,335
Claims priority, application Germany, Sept. 26, 1974, 2445991
Int. Cl.[2] G03B 7/00
U.S. Cl. 354—60 L **14 Claims**

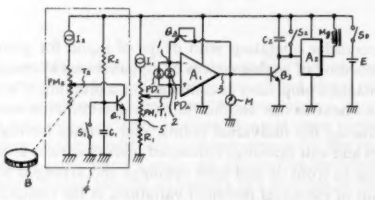


1. An improvement in a camera having a lens, a first photosensitive element for measuring the level of light incident thereon, a battery and circuit means for operably connecting said element and said battery, said circuit means including a warning lamp and first trigger means, wherein said improvement comprises actuation means having a closed position, an open position and a battery-test position, said circuit means including switch means for selectively connecting said battery across said warning lamp and first trigger means in series, said actuation means being so constructed that in said closed position said element is screened from all sources of light and said switch means is open, in said open position said lens and element are exposed to incident light and said switch means is open, and in said battery-test position said element is screened from all sources of light and said switch means is closed for connecting said warning lamp and first trigger means in series with said battery, and for rendering said first trigger means conductive so that said battery can drive current through said warning lamp, said warning lamp being positioned so that light output therefrom is visible when said actuation means is in said battery-test position, the light output of said warning lamp serving to indicate the state of charge of said battery.

4,072,961
LIGHT MEASURING CIRCUIT FOR AUTOMATIC EXPOSURE CONTROL

Seiji Yamada, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 5, 1976, Ser. No. 711,919
Claims priority, application Japan, Aug. 6, 1975, 50-96088
Int. Cl.[2] G03B 7/08
U.S. Cl. 354—24 **7 Claims**



1. In an automatic exposure control circuit including a focal plane shutter member opened to initiate exposure and closed to terminate the exposure, an integrating capacitor for timing closing of the focal plane shutter member, a light measuring circuit having at least one photocell for measuring scene light passing through the camera objective and reflected by the film surface and/or the surface of the shutter member located at the focal plane of the camera objective, the combination comprising:

first means for generating photoelectric current representative of light incident on said at least one photocell;

second means for amplifying said photoelectric current and having an amplification factor commensurate with the reflection factor of the film surface, said first and second means being coupled with said integrating capacitor to charge the latter with the respective currents generated thereby;

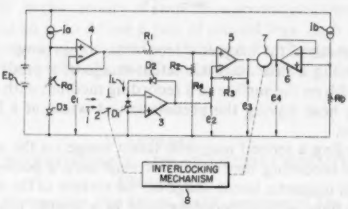
third means for actuating said first means in response to opening of said shutter member; and

fourth means for actuating said second means when said shutter member has been opened to a predetermined extent.

4,072,962
METERING DEVICE

Osamu Maida, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed June 29, 1976, Ser. No. 700,849
Claims priority, application Japan, July 3, 1975, 50-81449; July 24, 1975, 50-89610
Int. Cl.[2] G03B 7/08; G05B 1/06; G01J 1/42; H03K 5/20
U.S. Cl. 354—24 **9 Claims**



1. A metering device comprising:

a photoelectric converter circuit for generating a first voltage corresponding to the brightness of a subject to be photographed, said photoelectric converter circuit including a photoelectric converter element and a first conductor element for logarithmically converting the output of said photoelectric converter element;

a voltage generating circuit including a semiconductor element and a current source for providing a current proportional to an absolute temperature to a resistor connected in series to said second semiconductor element, said voltage generating circuit being effective to generate a second voltage comprising the sum of the voltages generated in said resistor and said second semiconductor element;

a differential amplifier for amplifying the voltage difference between said first and second voltage;

a voltage generating circuit for generating a third voltage proportional to the absolute temperature;

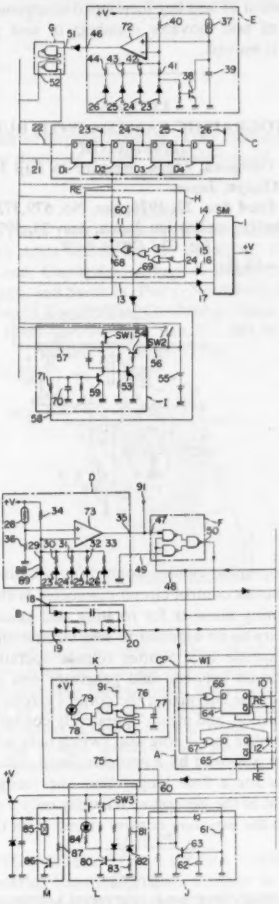
a comparator circuit for comparing the output voltage of said differential amplifier with said third voltage; and

means for equalizing the output voltage of said differential amplifier and said third voltage by the output of said comparator circuit.

4,072,963
PROGRAMME-CONTROLLED SHUTTER

Hiroshi Iwata, Osaka, and Katsuji Ishikawa, Higashi-Osaka, both of Japan, assignors to West Electric Co., Ltd., Japan

Filed Apr. 26, 1976, Ser. No. 679,996
Claims priority, application Japan, Apr. 30, 1975, 50-52982
The portion of the term of this patent subsequent to Dec. 14, 1993, has been disclaimed.
Int. Cl.[2] G03B 7/08
U.S. Cl. 354—31 21 Claims

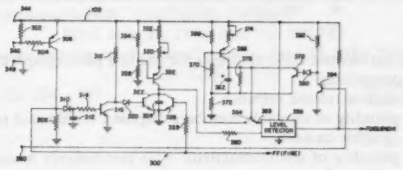


1. A programme-controlled shutter comprising
a. an exposure control mechanism comprising
a stepping motor, and
a plurality of shutter blades which function also as aperture setting blades and which are mechanically coupled to said stepping motor in such a way that when said stepping motor is driven, said shutter blades are opened and closed;
b. a motor control circuit with a first input terminal to which are applied the pulse signals for driving said stepping motor and a second input terminal to which is applied the signal for determining the direction of rotation of said stepping motor;
c. a pulse generator circuit for generating said driving pulses in succession;
d. a memory circuit having a plurality of output terminals and generating the output signals at said plurality of output terminals in response to the number of the pulse signals transmitted thereto from said pulse generator circuit;
e. a first control means including a first photometric circuit for measuring the brightness of a subject, said first control means controlling said pulse generator circuit by the comparison of the output signal from said first photometric circuit with the output signals from said output terminals of said memory circuit; and
f. a second control means including a second photometric circuit for measuring the brightness of a subject, said second photometric circuit being actuated in response to the output signals from said output terminals of said memory circuit,
said second control means generating the closing signal for closing said shutter blades when the light brightness detection quantity measured by said second photometric circuit reaches a predetermined level.
said closing signal being applied to said second input terminal of said motor control circuit and to said first control means, whereby said shutter blades are closed.

4,072,964
SCENE LIGHT RESPONSIVE VARIABLE QUENCH TIME DELAY FOR QUENCH STROBE

William R. Pope, and William A. Shelton, both of Cambridge, Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed May 13, 1976, Ser. No. 686,020
Int. Cl.[2] G03B 7/16
U.S. Cl. 354—33 20 Claims



1. A photographic camera apparatus comprising:
a housing;
means for mounting an objective lens on said housing;
means associated with said housing for receiving a source of electrical energy;
a source of artificial illumination;
means within said housing for defining a film exposure plane;
a blade assembly mounted and arranged within said housing for displacement from an initial closed arrangement wherein said blade assembly precludes scene light from impinging on said exposure plane to a second arrangement wherein said blade assembly defines a maximum aperture through which scene light is permitted to impinge on said exposure plane and then to a final closed arrangement wherein said blade assembly again precludes scene light from impinging on said exposure plane, such a displacement of said blade assembly serving to define an exposure interval during which scene light is incident upon said film exposure plane;
scene light detecting means energizable by the source of electrical energy for providing an output signal in correspondence to the amount of scene light detected; and
means, at least in part energizable by the source of electrical energy, for initiating the displacement of said blade assembly from its said initial closed arrangement towards its second arrangement thereby commencing the exposure interval and for initiating the energization of the source of artificial illumination to effect the firing thereof subsequent to the initiating of the exposure interval, and then responsive to said output signal of said scene light detecting means reaching a predetermined value indicative of a select film exposure value for effecting the displacement of said blade assembly into its said final closed arrange-

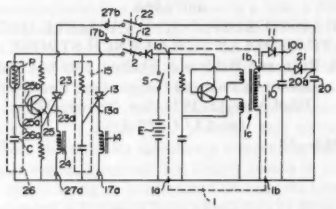
ment and for initiating the deenergization of the source of artificial illumination to effect the termination of the firing thereof subsequent to the expiration of a select time delay, said last stated means further including means for progressively varying said select time delay in a gradual manner through a plurality of incrementally changing time values in a determinate time range with each of said time delay values corresponding directly to a discrete value of a characteristic of said output signal of said scene light detecting means, said characteristic also varying in a gradual manner through a plurality of incrementally changing values in a determinate range.

4,072,965

ELECTRONIC SHUTTER CONTROL CIRCUIT

Toshihiro Kondo, Chofu, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Mar. 15, 1976, Ser. No. 666,614
Claims priority, application Japan, Mar. 19, 1975, 50-33195
Int. Cl.[2] G03B *7/08, 9/08*
U.S. Cl. 354—51 **6 Claims**



1. An electric control circuit for use in a photographic camera comprising

a shutter release member,

a plurality of movable members disposed within said photographic camera,

a plurality of electromagnetic coils respectively associated with said movable members,

a DC power source,

means for increasing the voltage level of said DC power source,

a plurality of capacitors responsive to said voltage level increasing means and being charged by the voltage produced thereby,

a plurality of controllable switching means respectively connected to said plurality of capacitors, said plurality of electromagnetic coils being respectively responsive to said plurality of controllable switching means,

a plurality of timing circuits respectively connected to said plurality of controllable switching means for applying control signals thereto, each timing circuit having a timing period established thereby,

first switching means for connecting said DC power source to said plurality of timing means to initiate the respective timing periods thereof,

a plurality of further switching means for respectively connecting said plurality of capacitors to said plurality of controllable switching means,

said first switching means and plurality of further switching means being responsive to the actuation of said shutter release member of said photographic camera to

a. initiate said timing periods by connecting said DC power source to said plurality of timing means via said first switching means so that a first of said control signals is applied to a first of said controllable switching means after a first of said timing periods elapses and a second of said control signals is applied to a second of said controllable switching means after a second of said timing periods elapses;

b. discharge a first of said capacitors through said first controllable switching means and its associated electromagnetic coil via a first of said further switching means in response to said first control signal being applied to said first controllable switching means so that upon the energization of said last-mentioned electromagnetic coil a first of said movable members of said photographic camera is moved, and

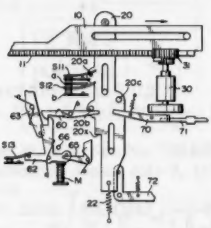
c. discharge a second of said capacitors through said second controllable switching means and its associated electromagnetic coil via a second of said further switching means in response to said second control signal being applied to said second controllable switching means so that upon the energization of said last-mentioned electromagnetic coil a second of said movable members of said photographic camera is moved.

4,072,966

PHOTOGRAPHIC CAMERA WITH BUILT-IN GENERATOR

Seiji Asano, Okegawa, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Apr. 22, 1976, Ser. No. 679,373
Claims priority, application Japan, Apr. 24, 1975, 50-50015
Int. Cl.[2] G03B *7/08*
U.S. Cl. 354—60 R **13 Claims**



1. A photographic camera comprising a built-in generator, an electric shutter control circuit connected with said generator, an operating member for rotating said generator to produce electricity to be supplied to said electric shutter control circuit in response to a shutter release operation, a power switch interposed between said generator and said exposure control circuit for energizing the control circuit when it is in the closed position, and means operatively connected with said operating member for closing said switch only when the operating member is moved by a predetermined distance to rotate the generator for a time longer than the rising time of the output current of the generator, whereby only a stable current is supplied to the exposure control circuit from the generator.

4,072,967

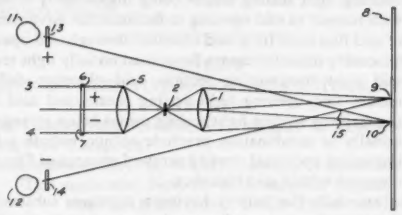
STEREOSCOPIC PROJECTION MICROSCOPY

Leslie Peter Dudley, 11088 Ophir Drive, No. 307, Los Angeles, Calif. 90024

Filed May 4, 1976, Ser. No. 683,191
Int. Cl.[2] G03B *21/00*
U.S. Cl. 354—79 **10 Claims**

1. A stereo microscopic projection system comprising the following elements: a monocular microscope for examining a specimen; a substage condenser included in the microscope on one side of the plane of support of the specimen; and objective lens included in the microscope on the other side of the plane of the specimen; a light source positioned to direct a beam of light through said substage condenser, said beam being converged by said substage condenser in the plane of support of the specimen for illuminating the specimen, and said beam entering said objective lens as a divergent beam; a beam splitter comprising complementary filters located in the light path between the light source and the substage condenser, said

beam splitter causing said divergent beam to comprise two disparate aspects of the specimen to cause said objective lens to



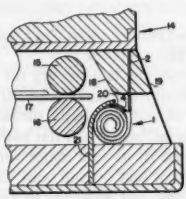
produce a pair of disparate images of the specimen; and means on which the disparate images are materialized.

4,072,968

SELF-RETRACTING IMBIBITION CHAMBER FOR CAMERAS AND METHOD OF MAKING THE SAME

Edwin H. Land, Cambridge; Albert J. Bachelder, Lexington, both of Mass., and Sarah H. Perry, Northfield, Minn., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 27, 1976, Ser. No. 680,781
Int. Cl.[2] G03B *17/50*
U.S. Cl. 354—86 **11 Claims**



1. In combination with a camera having a pair of processing rolls through which a film unit may be advanced for processing, a tightly coiled helix of springy opaque material having inturned film retaining flanges fluted with adjacent regions of said material to permit coiling without creasing, said coiled helix being mounted in said camera in front of said rolls with portions of said flanges spread from a projecting end flap of said helix to receive the end of a film unit passing out between said rolls.

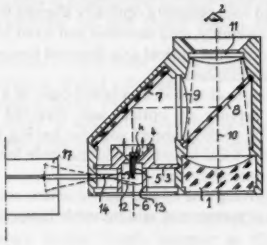
4,072,969

RANGING SYSTEM FOR CAMERA VIEWFINDER

Michael Cheavin, Enger, Germany, assignor to Balda-Werke Photographische Geräte und Kunststoff GmbH & Co. KG., Bunde, Germany

Filed Nov. 16, 1976, Ser. No. 742,517
Claims priority, application Germany, July 16, 1976, 2632143
Int. Cl.[2] G03B *13/20*
U.S. Cl. 354—166 **10 Claims**

1. An improved ranging system for an encased camera of the type having an objective lens mounted in said camera casing, and focusing means therefor, said ranging system being of the type including an optically aligned eyepiece and viewfinder lens defining a field of view for an operator looking through said system, said field of view including the scene to be photographed, said improving ranging system comprising, in combination, a luminous marking means lying substantially in the plane of said viewfinder lens, said marking means including a movably mounted masking means, said masking means being axially movable substantially at an angle normal to said plane of said marking means, said movable masking means including a reflective surface which is angularly oriented at about 45° to said axis of movement thereof, said marking means including a mirrored surface corresponding to said reflective surface which is similarly angularly oriented; means for axially moving said masking means, said moving means being operatively connected to said focusing means for axially displacing said masking means in correspondence to a focusing movement;



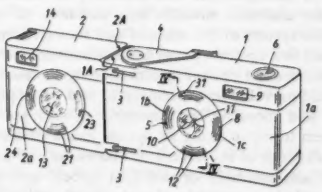
and means for superposing an image of said marking means in the line of sight between said eyepiece and said viewfinder lens, said means translating an axial movement of said masking means into a laterally displaced image transfer in the line of sight between said eyepiece and said viewfinder lens.

4,072,970

STILL CAMERA

Alfred Winkler, Munich, Germany, assignor to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed June 22, 1976, Ser. No. 698,743
Claims priority, application Germany, June 25, 1975, 2528221
Int. Cl.[2] G03B *17/04*
U.S. Cl. 354—187 **27 Claims**



1. In a photographic apparatus, particularly in a still camera, a combination comprising a camera body including a first section and a second section, each of said sections having a first side and a second side adjacent to the respective first side; means for articulately connecting said sections with each other so that one of said sections is movable with respect to the other of said sections between a first position in which said first sides are adjacent to each other and a second position in which said second sides are adjacent to each other, said first section having a film-receiving chamber which fully confines the film in either position of said one section; and means for releasably holding said one section in at least one of said positions.

4,072,971

FOCUS ADJUSTMENT AND DETERMINATION MEANS

Makoto Kuboshima, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 8, 1975, Ser. No. 603,225
Claims priority, application Japan, Aug. 14, 1974, 49-93595
Int. Cl.[2] G03B *3/00*
U.S. Cl. 354—201 **12 Claims**

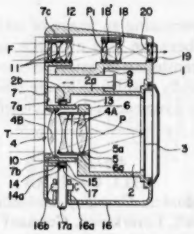
1. A photographic camera which comprises, in combination: first and second focusing optical systems of different focal length, one of said first and second optical systems being

used for directing rays of light, carrying an image of an object to be photographed, towards a photosensitive material and the other of said first and second optical systems being used for directing said rays of light towards a viewfinder arrangement for finding the position of the focal point of said one of said first and second optical systems;

said first optical system including a movable lens assembly and a fixed lens assembly optically aligned with said movable lens assembly, said movable and fixed lens assemblies having a common optical axis directed towards the object to be photographed;

said second optical system composed only of a movable lens assembly having an optical axis directed towards the object to be photographed and also having a focal length equal to the focal length of said movable lens assembly of said first optical system;

means for moving one of said movable lens assembly of said first optical system and said movable lens assembly of said



second optical system in a direction towards and away from the object to be photographed; and

linkage means for transmitting the movement of said either one of said movable lens assembly of said first optical system and said movable lens assembly of said second optical system to the other of said movable lens assembly of said first optical system and said movable lens assembly of said second optical system thereby to cause said other of said movable lens assembly of said first optical system and said movable lens assembly of said second optical system to move along its optical axis a distance equal to the distance of movement of said either one of said movable lens assembly of said first optical system and said movable lens assembly of said second optical system, the image of the object being focused on the photosensitive material when the same image of the object is visually sharply represented to the eyes of a photographer through the viewfinder arrangement.

4,072,972

PHOTOGRAPHIC FILM CASSETTE

Nicholas Gold, Arlington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 485,795, July 5, 1974, abandoned. This application Mar. 31, 1976, Ser. No. 672,168

Int. Cl.[2] G03B *17/26*

U.S. Cl. 354—275 **31 Claims**

1. Photographic film apparatus comprising:

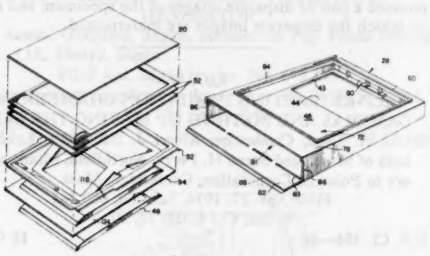
opaque means for defining a film chamber of substantially shallow depth, said chamber defining means including a first wall having a light transmitting section and a second wall spaced from said first wall by a distance establishing said shallow depth;

a plurality of substantially flat unexposed film units disposed in a stacked array within said chamber and stacked depthwise of said chamber in alignment with said light transmitting section to facilitate the sequential exposure of said film units to actinic radiation entering said chamber through said light transmitting section, said chamber defining means further including means for defining an opening through which said film units may be sequentially advanced from said chamber following their exposure;

means for at least initially light sealing said opening, said opening light sealing means being displaceably mounted with respect to said opening to facilitate the advancement of said film units from said chamber through said opening;

displaceably mounted means for at least initially light sealing said light transmitting section, said chamber defining means, said opening light sealing means and said light transmitting section light sealing means being arranged to initially in combination preclude actinic radiation from impinging upon said stacked array of unexposed film units disposed within said chamber;

a substantially flat battery having a thickness substantially less than the shortest distance between said first and sec-



ond walls, said battery including a pair of terminals on one of its two major surfaces; and

means for positioning said battery on the opposide side of said second wall from said stacked array of film units with the other of its said two major surfaces facing said second wall, the dimensions of said flat battery being selected so that no portion of its said major surfaces extend beyond the periphery of said second wall, said positioning means being structured and arranged to expose said battery terminals exteriorly of said apparatus when said battery is located on the opposite side of said second wall from said stacked array of film units by said positioning means and further structured and arranged to facilitate the ready manual replacement of said flat battery from said apparatus with another similar flat battery.

4,072,973

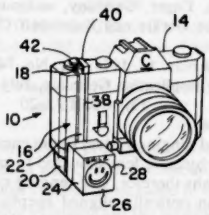
CAMERA SIGNAL SYSTEM FOR PORTRAIT TAKING

William D. Mayo, Green Glade Road, Phoenix, Md. 21131

Filed Jan. 26, 1976, Ser. No. 652,308

Int. Cl.[2] G03B *17/56*

U.S. Cl. 354—295 **6 Claims**



1. In a system for use with a camera having a motion-actuable shutter release for taking exposures of animate subjects and the like, means for signalling said subjects before taking exposures, and means for energizing the system, the improvement comprising: the means for signalling including at least one signal remotely projectable for detection by said subject, means for insuring that said at least one signal will be given

prior to taking an exposure, including a switch element positionable for covering a said shutter release and having connection for switching-on the means for signalling, and the motion for actuating a said shutter release being impartable through the switch element.

4,072,974

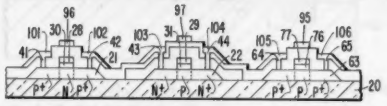
SILICON RESISTIVE DEVICE FOR INTEGRATED CIRCUITS

Alfred Charles Ipri, Marlton, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 491,115, July 23, 1974, abandoned. This application Nov. 18, 1976, Ser. No. 742,852

Int. Cl.[2] H01L *27/02, 27/12, 29/04*

U.S. Cl. 357—23 **4 Claims**



1. In an integrated circuit of the type comprising a shift register cell comprised of a first complementary symmetry metal-oxide-semiconductor transmission gate, a first complementary symmetry metal-oxide-semiconductor inverter having a common gate electrode connected to the output of the first gate, a second complementary symmetry metal-oxide-semiconductor transmission gate having an input connected to the output of the first inverter and a second complementary symmetry metal-oxide-semiconductor inverter having a common gate electrode connected to the output of the second complementary symmetry metal-oxide-semiconductor gate, the improvement comprising a resistive device comprised of an island of polycrystalline silicon having three regions of the same conductivity type, two of the regions having a high impurity concentration with conductive contacts connected thereto, the other regions separating the first mentioned regions and having a moderate impurity concentration, the resistive device being connected between the output of the second complementary sgymmetry metal-oxide-semiconductor inverter and the input of the first complementary symmetry metal-oxide-semiconductor inverter.

4,072,975

INSULATED GATE FIELD EFFECT TRANSISTOR

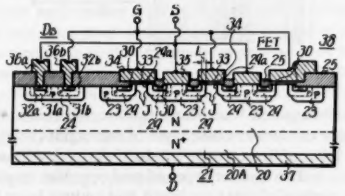
Akiyasu Ishitani, Atsugi, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 22, 1977, Ser. No. 790,089

Claims priority, application Japan, Apr. 29, 1976, 51-48967

Int. Cl.[2] H01L *29/78, 27/02, 29/06*

U.S. Cl. 357—23 **4 Claims**



1. An insulated gate field effect transistor comprising:

a semiconductor substrate;

a drain region in said substrate of a first conductivity type facing both of the major surfaces of said semiconductor substrate;

a frame region of a second conductivity type facing one of said major surfaces of said semiconductor substrate;

a base region of the second conductivity type facing said one major surface and connected to said frame region, said base region forming a PN junction with said drain region;

a source region of the first conductivity type facing said one major surface and formed in said base region whereby said source region is surrounded by said base region;

a source electrode on said frame region and said source region;

a drain electrode on said drain region facing the other of said major surfaces of said substrate;

a gate insulating layer; and

a gate electrode on said gate insulating layer facing said one major surface through said gate insulating layer.

4,072,976

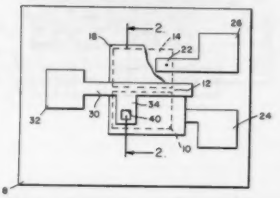
GATE PROTECTION DEVICE FOR MOS CIRCUITS

Eliyahou Harari, Irvine, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 28, 1976, Ser. No. 754,932

Int. Cl.[2] H01L *29/78, 27/02*

U.S. Cl. 357—23 **6 Claims**



1. In an improved MOS device of the type having at least one field effect transistor with source, channel and drain regions formed in a semiconductor substrate, a metallic gate electrode and a gate dielectric layer which insulates said gate electrode from said source, gate and drain regions, source and drain electrodes connected to said source and drain regions respectively through ohmic connections, the improvement which comprises:

a. a predetermined section of said gate dielectric which is relatively thin with respect to the remaining portion of said dielectric layer;

b. a predetermined portion of said metallic gate electrode which is relatively thin with respect to the remaining portion of said gate electrode and is adjoining said relatively thin section of said gate dielectric whereby when an excessive voltage pulse is applied on said gate electrode it will cause a rupture in said thin dielectric region and a part of the metal of said relatively thin portion of said gate electrode will cause a temporary electrical short circuit between said gate electrode and said semiconductor substrate and said Joule heat produced in the vicinity removes said metal from said point of rupture and thus said short circuit is eliminated.

4,072,977

READ ONLY MEMORY UTILIZING CHARGE COUPLED DEVICE STRUCTURES

Robert T. Bate, Richardson, and John Millard Caywood, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

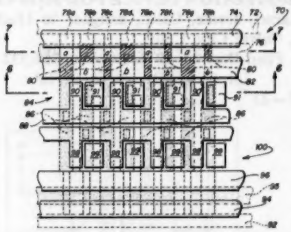
Continuation of Ser. No. 497,162, Aug. 13, 1974, abandoned. This application July 9, 1976, Ser. No. 703,736

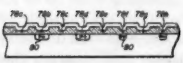
Int. Cl.[2] H01L *29/78*

U.S. Cl. 357—24 **7 Claims**

1. A read only memory comprising a charge coupled device shift register having a semiconductor substrate defining a channel overlaid by phase electrodes spanned and insulated from

said channel for serial propagation along toward an output end of said channel of charge packets introduced in said channel; said shift register having a plurality of stages each defined by a plurality of adjacent phase electrodes; charge source means spaced from and extending lengthwise of said channel; first charge storage means including first respective charge storage regions defined between said charge source means and a first phase electrode of each of said stages, said first respective charge storage regions being arranged in a first predetermined pattern of different charge storage capacities; second charge storage means including second respective charge storage regions defined between said charge source means and a second phase electrode of each of said stages, said second respective charge storage regions being arranged in a second predetermined pattern of different charge storage capacities; said first and second charge storage means also including first and second storage gate means respectively; said first storage gate





means overlying and insulated from said first storage regions, said second storage gate means overlying and insulated from said second storage regions; transfer gate means insulated from said substrate; said transfer gate means and said first storage gate means together enabling simultaneous transfer of charge from said charge source means to said first charge storage regions, said transfer gate means and said second storage gate means together enabling simultaneous transfer of charge from said charge source means to said second charge storage regions; said first storage gate means and said first phase electrodes together enabling subsequent simultaneous transfer of said charge packets from said first storage regions to said channel beneath corresponding ones of said first phase electrodes, said second storage gate means and said second phase electrodes together enabling subsequent simultaneous transfer of said charge packets from said second storage region into said channel beneath corresponding ones of said second phase electrodes.

4,072,978

CCD INPUT AND NODE PRESET METHOD

Dennis Darcy Buss, Richardson; Stephen P. Emmons, and James Brockman Barton, both of Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

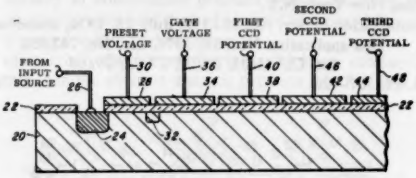
Continuation of Ser. No. 617,451, Sept. 29, 1975, abandoned, which is a continuation of Ser. No. 373,567, June 25, 1973, abandoned. This application July 11, 1977, Ser. No. 814,528

Int. Cl.[2] **H01L** *29/78*

U.S. Cl. 357—24 **9 Claims**

1. A method of inputting charge packets into a charge coupled device structure comprising a semiconductor substrate, a minority carrier charge source region disposed in said substrate near one surface thereof, a minority carrier charge storage region in said substrate near said one surface and spaced apart from said charge source region, an insulating layer disposed on said one surface, and a signal electrode disposed on said insulating layer over said space between said source region and said storage region, wherein each of said charge packets comprises a quantity of charge inversely proportional to the magnitude of an analog input signal comprising the steps of:

a. simultaneously applying: a source voltage to said charge source of a magnitude smaller than the smallest magnitude of said analog input signals, and a predetermined voltage



to said signal electrode of a magnitude which prevents charge flow between said charge source and said charge storage region; then

b. applying said analog input signal to said signal electrode; and then

c. increasing the magnitude of said source signal to a value greater than that of the magnitude of said input signal to thereby trap a minority carrier charge packet in said charge storage region of a magnitude inversely proportional to the magnitude of said input signal.

4,072,979

INTEGRATED POWER AMPLIFIER

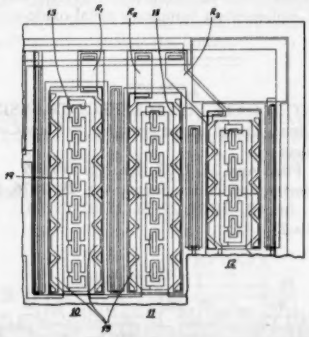
Sergio Palara, San Martino di Ferrara, Italy, assignor to SGS-ATES Componenti Elettronici S.p.A., Agrate Brianza (Milan), Italy

Filed June 10, 1976, Ser. No. 694,791

Claims priority, application Italy, June 10, 1975, 24160/75

Int. Cl.[2] **H01L** *29/72;* **H03F** *3/14*

U.S. Cl. 357—36 **3 Claims**



1. In an integrated transistor structure wherein a semiconductor body comprises a base layer of one conductivity type, a collector layer of the opposite conductivity type adjoining said base layer, and an emitter layer of said opposite conductivity type on a surface of said base layer, said emitter layer forming a multiplicity of emitter areas arrayed in at least one row and constituting respective elemental transistors with corresponding portions of said base and collector layers, each emitter area including a central zone flanked by a pair of lateral zones which are connected with said central zone by narrower transverse zones, said central zones being interconnected by a conductor strip extending to a common emitter terminal at one end

of said row, said collector and base layers being respectively connected to a common collector terminal and to a common base terminal, the improvement wherein the widths of said transverse zones decrease progressively from a first elemental transistor at said one end of said row to a last elemental transistor at the other end thereof with a corresponding increase in the resistances of said transverse zones for substantially equalizing the current distribution among the elemental transistors of said row.

4,072,980

THYRISTOR

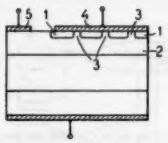
Fritz Kirschner, Lohhof, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

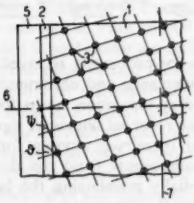
Filed May 4, 1976, Ser. No. 683,206

Claims priority, application Germany, May 6, 1975, 2520134

Int. Cl.[2] H01L *29/74*

U.S. Cl. 357—38 **5 Claims**





1. A rectangular semiconductor thyristor element having at least four zones of alternate conductivity type with an outer zone forming an emitter and with an adjacent inner zone forming a base, said emitter zone extending over a substantial portion of said base zone and spaced from one marginal edge of said base zone, an emitter electrode in contact with said emitter zone and covering a substantial portion thereof, a strip control electrode on said base adjacent said one marginal edge thereof, said emitter having a large number of openings therethrough through which portions of said base extend into contact with said emitter electrode thereby providing shunts for disruptive discharges during operation, said shunts being located in a series of equally spaced first lines which form an angle with said control electrode of from 0° to 45°, said shunts also being along a series of equally spaced parallel second lines which make a second angle smaller than 90° and larger than 45° with respect to said strip shaped control electrode, each of said shunts lying in both a first line and in a second line, said arrangement of said first and second lines forming a grid-like pattern.

4,072,981

FAST SWITCHING DARLINGTON CIRCUIT

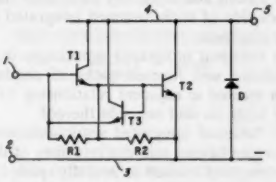
Christopher T. Black, Bedford, and Anthony Lear, Huntingdon, both of England, assignors to Texas Instruments Incorporated, Dallas, Tex.

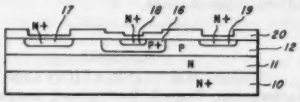
Division of Ser. No. 669,585, March 23, 1976, Pat. No. 4,028,561. This application Nov. 15, 1976, Ser. No. 742,050

Claims priority, application United Kingdom, Mar. 25, 1975, 12373/75

Int. Cl.[2] H01L *27/02*; H03K *3/33*

U.S. Cl. 357—46 **7 Claims**





1. A fast switching darlington output circuit comprising first and second superposed semiconductor layers of first conductivity type, said second layer having a higher resistivity than said first layer; a third semiconductor layer having opposite conductivity type on said second layer; said second and third layers providing a common collector and base region respectively for each of first, second and third transistors; a first region of said opposite conductivity type in said third layer and extending to the outer surface thereof, said first region having said opposite conductivity type and lower resistivity than said third layer; three further regions having said first conductivity type, first and second ones of said further regions located in said third layer and extending to said outer surface thereof, the third further region disposed in said first region and extending to the outer surface of said third layer; said two further regions providing emitter regions of said first and second transistors respectively and said third further region providing an emitter region of said third transistor.

4,072,982

SEMICONDUCTOR COMPONENT WITH DIELECTRIC CARRIER AND ITS MANUFACTURE

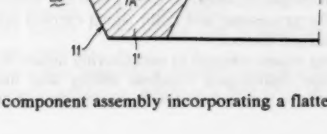
Karl-Ulrich Stein, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 2, 1975, Ser. No. 592,526

Claims priority, application Germany, July 4, 1974, 2432544

Int. Cl.[2] H01L *27/12, 23/14*

U.S. Cl. 357—49 **4 Claims**



1. In a component assembly incorporating a flattened, inte-

grated semiconductor circuit structure of the type having a plurality of discrete sites of doped, semiconductor material which discrete sites are interconnected together in a predetermined manner by thin layered paths of conductive material, the improvements which comprise:

(A) a dielectric carrier layer generally continuously overlying, and integrally bonded to, surface portions of such flattened integrated semiconductor circuit structure on one side thereof, said carrier layer being comprised of a polyimide resin,

(B) a semiconductor wall member generally continuously perimetrically circumscribing such integrated semiconductor circuit and integrally associated therewith on the opposed side of such flattened integrated semiconductor circuit structure,

(C) such flattened integrated semiconductor circuit structure having said layered paths of conductive material therein located in adjacent relationship to said dielectric carrier layer on said one side thereof,

(D) such flattened integrated semiconductor circuit structure further having said discrete sites of doped semiconductor material located in laterally spaced relationship to said wall member, and

(E) said carrier layer having a thickness at least sufficient to provide mechanical support for said circuit structure and said thin layered paths.

4,072,983

SECAM IDENTIFICATION CIRCUIT

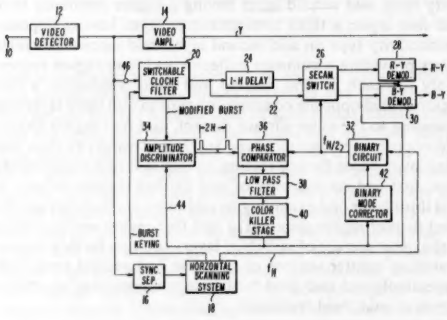
Felix Aschwanden, Thalwil, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed Jan. 7, 1977, Ser. No. 757,556

Claims priority, application United Kingdom, Feb. 24, 1976, 07247/76

Int. Cl.[2] H04N *9/46, 9/49*

U.S. Cl. 358—19 **10 Claims**



1. In a system for processing color television signals of the SECAM type in which a binary circuit for producing a substantially square wave output recurring at one-half of the image line scanning rate is included for synchronizing the demodulation of at least first and second color signal carriers of different frequencies recurring alternately in a line-by-line sequence and modulated during line scanning intervals with respective color image information signals, said SECAM type signal further including first and second synchronizing burst components having frequencies corresponding, respectively, to those of said carriers and occurring during line retrace intervals adjacent in time to an associated color carrier, a color signal identification circuit comprising:

signal filtering means exhibiting a bell-shaped amplification versus frequency response during said line scanning intervals for processing said color signal carriers prior to demodulation thereof;

switching means coupled to said filtering means for modifying said bell-shaped response during said line retrace intervals to increase relatively the response at one of said burst component frequencies with respect to the response at the other of said burst component frequencies;

detection means coupled to said filtering means, responsive to burst components of increased amplitude coupled from said filtering means and relatively unresponsive to said other burst components, for producing output pulses at one-half said line scanning rate in timed relation with said increased amplitude burst components;

phase comparator means responsive to said pulses and to said square wave for providing an error correction signal representative of the time relation of said pulses and said square wave; and

means coupled to said binary circuit and responsive to said error correction signal for synchronizing the operation of said binary circuit with respect to the time sequence of said first and second carriers so as to provide proper recovery of said color information signals.

4,072,984

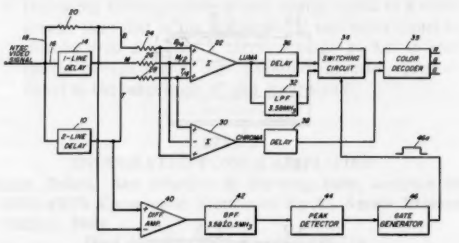
CHROMINANCE-LUMINANCE SEPARATOR

Arthur Kaiser, Trumbull, Conn., assignor to Thomson-CSF Laboratories, Inc., Stamford, Conn.

Filed Apr. 14, 1975, Ser. No. 567,730

Int. Cl.[2] H04N *9/535*

U.S. Cl. 358—31 **10 Claims**



6. In an apparatus for processing received television input signals containing luminance and chrominance components, said apparatus including separation means for combining different scanlines of the received television signal to derive the luminance component therefrom; a system for removing spurious chrominance components from the derived luminance signal while substantially maintaining the bandwidth of the derived luminance signal, comprising:

means for detecting vertical chrominance transitions within a television picture of said television input signal and for generating a control signal as a function of the transitions;

means for filtering the derived luminance signal; and

switching means for receiving the derived luminance signal and the filtered luminance signal and responsive to said control signal for selecting as its output one of said derived luminance signal or said filtered luminance signal.

4,072,985

VIDEO DISC WITH A DIELECTRIC LAYER FORMED FROM STYRENE AND NITROGEN

Grzegorz Kaganowicz, Princeton, N.J., and John Walter Robinson, Levittown, Pa., assignors to RCA Corporation, New York, N.Y.

Filed May 4, 1977, Ser. No. 793,872

Int. Cl.[2] H04N *1/28;* B32B *3/02, 15/08, 15/20*

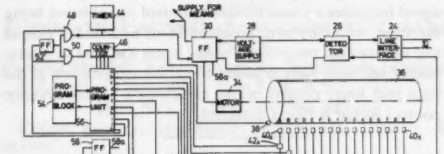
U.S. Cl. 358—128 **10 Claims**

1. A capacitive recording means comprising a disc having a spiral groove on the face thereof with audio/video information in the form of geometric variations in said groove, a thin conductive layer thereon and a thin dielectric layer formed from styrene and nitrogen in a glow discharge on said conductive layer.

4,072,986
MESSAGE SYNTHETIZER

Lars Heidergren, Lidingo, Sweden, assignor to AB Gylling & Co., Bromma, Sweden

Filed Aug. 1, 1975, Ser. No. 601,199
Claims priority, application Sweden, Aug. 9, 1974, 7410212
Int. Cl.[2] G11B *5/00*
U.S. Cl. 360—12 4 Claims

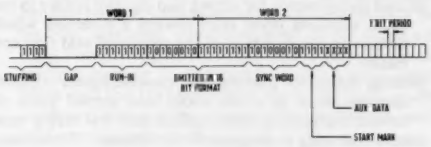


1. Message synthetizer device for providing a message consisting of a number of separate digits, terms etc. indicating aspects and features of a sensed quantity condition in response to an interrogation signal, said device comprising: an interrogation detecting device connected to a communication circuit; a sensor means for sensing the value of said condition; an A-D-converter connected to said sensor means having an output for delivering the digital value of said sensed quantity; recorder means with a plurality of endless tracks with recordings of information including said digits, terms etc.; a plurality of read-out devices, one for each of said tracks; an output circuit individually connected from each read-out and each including a controlled switch device connected to a common signal line adapted to be connected to said communication circuit; means for continuously moving said endless tracks past said read-out devices; controlled memory devices connected to receive and, upon detection of an interrogation signal, to store said digital value from the A-D-converter and having controlled output circuits responsive to programmed signal sequence connected to selected ones of said controlled switch device for predetermining the path of control signals to selected controlled switch devices for connection of appropriate digit track read-out devices, one at a time, for read-out and transmission of the corresponding track recordings to said common signal line; a program device having output control connections to the controlled counter output circuits and selected ones of said controlled switch devices for controlling delivery of recorded track information in a predetermined sequence to said common output signal line; means connected to and initiated by said interrogation device for energizing the components of said synthetizer device providing a store command signal to said memory devices and starting said program device; and logic circuit means, connected to and controlled by said program device and having output control connections to said program devices and to said means for energizing said synthetizer components, for enabling at least one repeat transmission of the same synthetized message by said program device and then terminating transmission.

4,072,987
DIGITAL STORAGE SYSTEMS

Ian Clive Walker, Newbury, England, assignor to Micro Consultants Limited, England

Continuation-in-part of Ser. No. 670,935, March 26, 1976, Pat. No. 4,045,613. This application July 7, 1976, Ser. No. 703,172
Claims priority, application United Kingdom, Mar. 26, 1975, 12607/75
Int. Cl.[2] G11B *5/09*
U.S. Cl. 360—48 23 Claims

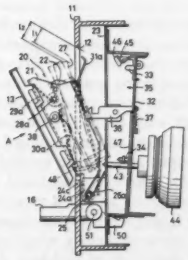


1. Apparatus for inserting synchronising data between blocks of serial data, said apparatus comprising:
(a) synchronising data generating means for producing a predetermined data sequence;
(b) selector means connected to said data generator and an input receiving said serial data for selecting either said serial data or said synchronising data;
(c) coding means connected to said selector means for encoding both said serial data and said synchronising data, and
(d) control means connected to an output of said coding means for producing an identification gap of a length equivalent to N bits of data before the start of the synchronising data whereby the signal produced at an output of said control means comprises a data gap followed by said synchronising data and said serial data.

4,072,988
CASSETTE LOADING DEVICE IN A CASSETTE TAPE RECORDER

Manabu Sato, Yokohama, and Shigeru Matumoto, Hiratsuka, both of Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Mar. 23, 1976, Ser. No. 669,630
Claims priority, application Japan, Apr. 22, 1975, 50-54088[U]
Int. Cl.[2] G11B *23/08, 15/00*
U.S. Cl. 360—96 5 Claims



1. In a cassette tape recorder having a loading space for accommodating a cassette loaded thereinto, an opening through which the cassette is inserted and taken out, and a capstan adapted to enter relatively into a capstan receiving opening in the cassette and to drive a tape within the cassette, said cassette loading device comprising:
a cassette holder for receiving and holding the cassette inserted thereinto;
a cassette holder supporting member rotatably supporting said cassette holder by means of a first pivot shaft;

a second pivot shaft for rotatably supporting said cassette holder supporting member between the loading space and an outside of the cassette tape recorder through the opening, said second pivot shaft being disposed at a fixed position in the vicinity of the capstan such that the distance between the second pivot shaft and said capstan is less than the distance between said capstan and the rear end of the cassette inserted into said cassette holder;

first spring means for urging said cassette holder supporting member to rotate about said second pivot shaft toward the outside of the cassette tape recorder;

second spring means for urging said cassette holder to rotate about said first pivot shaft toward a direction which is reverse to the direction of the torque of said first spring means;

pushing means for pushing said cassette holder supporting member so as to rotate about said second pivot shaft toward the loading space against said first spring means;

means, operating in response to the rotation of said cassette holder together with said cassette holder supporting member about said second pivot shaft by said pushing means, for rotating said cassette holder about said first pivot shaft in the direction opposite to the urging direction of said second spring means; and

locking means responsive to the accommodation of said cassette holder into the loading space for locking said cassette holder supporting member.

4,072,989

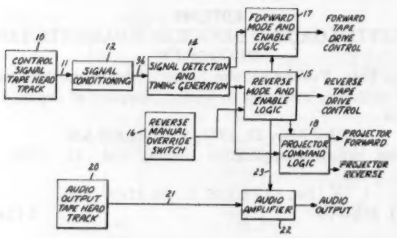
AUDIO-VISUAL PRESENTATION DEVICE

Robert Eugene Grant, Shoreview, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 7, 1976, Ser. No. 647,200

Int. Cl.[2] G03B *31/00*; G11B *31/00*

U.S. Cl. 360—80 **12 Claims**



1. An audio-visual presentation device including magnetic tape drive means adapted to move a magnetic recording tape in a forward and a reverse direction at first and second speeds with said second speed being greater than said first speed, said tape having at least one region in which a series of audio signal portions is recorded with each of said audio signal portions being preceded by a visual advance control signal, said device providing audio output in response to said audio signal portions and adapted for providing electrical control of the cycling of an optical projector having a remotely and electrically controllable single frame advance mechanism in response to one of said visual advance signals whereby during a normal automatic forward operation of said tape drive means at said first speed said device provides audio output and optical projector control such that said audio output and a display by said optical projector remain in synchronization with the visual advance signal preceding each of such audio signal portions initiating a single frame cycle command to the optical projector, said device including a first manually actuated switch means having first and second positions, said switch means when in said first position providing normal automatic forward operation at said first tape drive speed and when in said second position providing reverse direction control to said tape drive means at said second tape drive speed with the visual advance signals on the tape automatically controlling reverse cycling of said optical projector, wherein the improvement comprises:

first circuit means responsive to each of said visual advance control signals for providing a logic control signal that indicates whether a visual advance control signal is being detected; and

second circuit means operatively connected to said first switch means for responding to the position of said first switch and operatively connected to said first circuit means for responding to said logic control signal to provide a reverse control signal, when said first switch means is in said second position, for use in initiating reverse movement for the magnetic tape and for use with the single frame cycle commands in initiating reverse operation of the optical projector, provided said logic control signal indicates a visual advance control signal is not being detected, whereby synchronization of said audio output and said optical projector display is not lost due to operation of said first switch means to its second position at the time said logic control signal indicates a visual advance control signal is being detected.

4,072,990

SERVO POSITIONING SYSTEM FOR DATA STORAGE APPARATUS

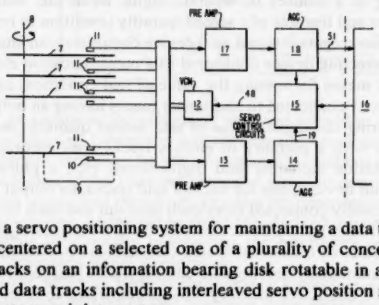
William John Philip Case, Winchester, and Robert Duncan Commander, Eastleigh, both of England, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 19, 1976, Ser. No. 706,313

Claims priority, application United Kingdom, July 24, 1975, 30922/75

Int. Cl.[2] G11B *5/56, 21/10, 17/00*

U.S. Cl. 360—77 **4 Claims**



1. In a servo positioning system for maintaining a data transducer centered on a selected one of a plurality of concentric data tracks on an information bearing disk rotatable in a disk file, said data tracks including interleaved servo position reference sectors and data sectors,

sampling means for sampling signals from said data transducer at times corresponding to said servo sectors;

means connected to said sampling means and responsive to said sampled signals to generate a first position error signal indicating deviations of said data transducer from said data track center, said first position error signal being limited in bandwidth by the frequency of occurrence of said servo sectors;

a servo disk, rotatable coaxially with said information bearing disk, and having continuous servo position reference information recorded thereon in a plurality of concentric servo tracks corresponding to said data tracks;

a servo transducer, movable conjointly with said data transducer, for sensing said servo information on said servo tracks as said servo disk rotates; and

means connected to said servo transducer and responsive to said sensed servo information signals to generate a second position error signal indicating deviations of said servo transducer from said servo tracks, said deviations corresponding nominally to said deviations of said data transducer from said data tracks but being subject to low frequency differential effects which reduce the accuracy of

said second position error signal, the improvement comprising;

means connected to both said position error signal generating means for combining low frequency components only of said first position error signal with high frequency components only of said second position error signal to provide a hybrid position error signal of increased bandwidth over said first position error signal and of greater accuracy than said second position error signal, and

actuator means for moving said data and servo transducers, said actuator means being connecting to receive said hybrid position error signal and being responsive thereto to maintain said data transducer centered over said selected data track.

4,072,991

AUTOMATIC MAGNETIC-TAPE CASSETTE CHANGING DEVICE

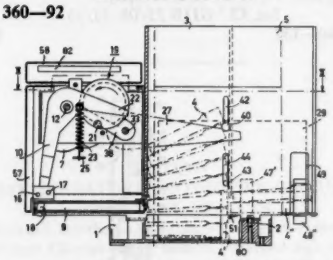
Cornelis Hendrik Kok, Wassenaar, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 19, 1975, Ser. No. 633,218

Claims priority, application Netherlands, Dec. 2, 1974, 7415667

Int. Cl.[2] G11B *15/68*

U.S. Cl. 360—92 **4 Claims**



1. An automatic magnetic tape cassette changing device comprising

a mounting frame,

a feed-in magazine for the temporary storage of a juxtaposed stack of cassettes to be fed to a tape recorder in the sequence of stacking, mounted to said frame,

a feed-out magazine mounted to said frame and arranged directly adjoining the feed-in magazine, for temporary storage in the reverse sequence of a number of cassettes moved away from said tape recorder,

a cassette pusher,

means for movably mounting the cassette pusher with respect to said magazine such that said pusher is movable to transfer a lowermost cassette of a stack of cassettes in the feed-in magazine to a position underneath cassettes stacked in the feed-out magazine,

a drive mechanism arranged for operative movement, and

means for actuating the cassette pusher in response to movement of the drive mechanism,

wherein the improvement comprises means for lifting and lowering cassettes present in the feed-in magazine between a lower position in which, said device being mounted on a tape recorder, a lowermost cassette of a stack of juxtaposed cassettes is in the position for operative engagement by the tape recorder, and a higher position in which the lowermost cassette is positioned in line with the cassette pusher, and for lifting juxtaposed cassettes present in the feed-out magazine from a lower position to a higher position, in said higher position a lowermost cassette in said feed-out magazine being disposed at least one cassette thickness higher than a corresponding position of the lowermost cassette in the feed-in magazine when said feed-in magazine has been lifted to its higher position,

wherein said lifting and lowering means includes:

a lifting element mounted for motion with respect to said frame between a higher and a lower position in the direction of stacking of the cassettes, and a cassette carrier element connected to said lifting element, and arranged to engage a lower surface of the lowermost cassette in the feed-in magazine, and

a resilient element connected to the lifting element and having a bent portion so arranged that, upon movement of the feed-out magazine from the lower position to the higher position the lowermost cassette in the feed-out magazine is engaged so as to lift the stack of cassettes in the feed-out magazine; and so connected and arranged that, a cassette having been moved by the pusher member into position underneath the stack of cassettes in the feed-out magazine, upon movement of the lifting element from the higher position to the lower position the resilient element is displaced by said cassette underneath such that the bent portion moves past said cassette underneath to a lower position for engagement with said cassette underneath.

4,072,992

CONTINUOUS LOOP TAPE CARTRIDGES

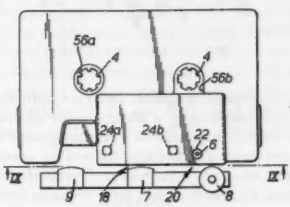
Edward Alexander Leshik, 122 Princess Court, Queensway, London W2, England

Filed Oct. 22, 1976, Ser. No. 734,730

Claims priority, application United Kingdom, Oct. 28, 1975, 44415/75

Int. Cl.[2] G11B *23/10*

U.S. Cl. 360—94 **14 Claims**



1. An adaptor and miniature tape module assembly adapted for use with a tape recording and/or play-back apparatus of the cassette type having reference boss means (**2**) for locating a magnetic tape cassette on a support surface of the apparatus, parallel spaced capstan (**6**) and pinch wheel means (**8**) arranged normal to said support surface for transporting the cassette tape along a given path relative to said support surface, sensing head means (**7**) arranged adjacent said given tape path, and a pair of parallel spaced drive spindles (**4**) arranged parallel to said support surface, said adaptor and miniature tape module assembly comprising

(a) an adaptor member having bottom, top, side and end wall surfaces, one of said side wall surfaces containing a recess (**50**);

(b) a hollow tape module housing having bottom, side and end walls, means for removably mounting said tape module housing in said recess with one of its side walls coincident with the said one side wall of said adaptor member, thereby to define an adaptor member and tape module assembly, the bottom wall of said module housing containing first apertures (**24***a*, **24***b*) for receiving the reference boss means of the apparatus, said adaptor member containing second apertures (**56***a*, **56***b*) for freely receiving in concentrically spaced relation the drive spindles of the apparatus; and

(c) a length of tape (**11**) mounted in said tape module housing, said tape module including guide means (**14**, **16**) for guiding said tape along a path parallel with and adjacent the inner surface of said one housing side wall;

(d) the bottom wall of said tape module housing containing a capstan aperture (**22**) on the side of said tape path remote

from said one housing side wall, said aperture being adapted to receive the drive capstan of the apparatus;

(e) the said one side wall of said housing containing a pinch wheel opening (**20**) adjacent said capstan opening, whereby the tape may be gripped between the pinch wheel and the drive capstan, the said one side wall of said housing also containing a sensing head opening (**18**) adjacent said tape path for receiving the sensing head during tape recording or play-back operation of the apparatus.

4,072,993

MULTI-ELEMENT MAGNETIC HEAD

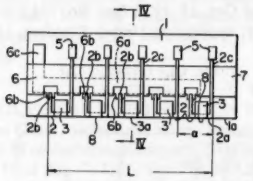
Noboru Nomura, Kyoto; Kenji Kanai, Neyagawa; Nobuyuki Kaminaka, Moriguchi, and Norimoto Nouchi, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 7, 1975, Ser. No. 629,981

Claims priority, application Japan, Nov. 12, 1974, 49-130787; Nov. 12, 1974, 49-130788; Nov. 12, 1974, 49-130789; Dec. 31, 1974, 50-1690; Dec. 31, 1974, 50-1691; Dec. 31, 1974, 50-1692

Int. Cl.[2] **G11B** *5/27, 5/20, 5/22*

U.S. Cl. 360—121 **9 Claims**



1. A multi-element magnetic head comprising a ferromagnetic material constituting a base; a yoke section including a plurality of thin plates made of a ferromagnetic material, each of said plates having a portion thereof in contact with said ferromagnetic base and arranged at the end thereof, said ferromagnetic base and each of said yoke sections forming a plurality of head gaps; a plurality of coils having first and second ends each made of a non-magnetic conductive layer and arranged adjacent each of said head gaps; and a common electrode layer commonly connected to the first end of each of said coils, said common electrode layer crossing the other end of each of said coils and being located on said base at a position remote from said gaps.

4,072,994

READ-AFTER-WRITE HEAD

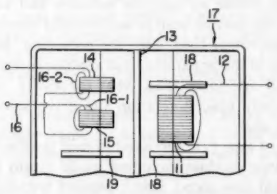
Hideo Takashima, Chichibu, Japan, assignor to Canon Kabushiki Kaisha, Tokyo and Canon Denshi Kabushiki Kaisha, both of, Japan

Filed Dec. 22, 1975, Ser. No. 643,330

Claims priority, application Japan, Dec. 28, 1974, 50-2493; Dec. 28, 1974, 50-2494

Int. Cl.[2] **G11B** *5/20*

U.S. Cl. 360—124 **33 Claims**



1. A read-after-write head comprising:

a recording core provided with an information write-in winding for writing information and consisting of two tracks;

a reading core provided with an information read-out winding for reading information and consisting of two tracks;

first shielding means for magnetically separating said recording core and said reading core;

means provided on the reading core side with respect to said shield means and respectively at the outside of said two tracks of said reading core for eliminating electric potential induced in said reading core by the cross-field from said recording core; and

a casing for covering said recording core, said reading core, said first shield means and said eliminating means.

4,072,995

TAPE VIEWING SYSTEM FOR MICRO-CASSETTE TAPE RECORDER

Masaaki Sato, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Nov. 11, 1976, Ser. No. 741,154

Claims priority, application Japan, Nov. 21, 1975, 50-158324[U]; Dec. 15, 1975, 50-169838[U]; Dec. 18, 1975, 50-171277[U]; Dec. 18, 1975, 50-171278[U]

Int. Cl.[2] **G11B** *23/08, 23/38*

U.S. Cl. 360—137 **8 Claims**

1. A tape viewing system for a micro-cassette tape recorder having a cassette receiving chamber; said chamber having a bottom surface and a lid opposite said bottom surface; said lid having a transparent viewing window; said cassette having a tape viewing section; said window being aligned with said tape viewing section when said cassette is inserted in said chamber;

a light transmitting opening in said bottom surface of said cassette receiving chamber and located within the boundaries of said tape viewing section and said tape viewing window, external light incident on at least portion of the casing of the recorder being led through the light transmitting opening to be incident on the rear side of the tape cassette, thereby facilitating a tape viewing through the tape viewing window.

4,072,996

METHOD AND ARRANGEMENT FOR ARC QUENCHING IN ARRESTERS

Rene Rudolph, Zurich, Switzerland, assignor to BBC Brown, Boveri & Company Limited, Baden, Switzerland

Filed June 15, 1976, Ser. No. 696,228

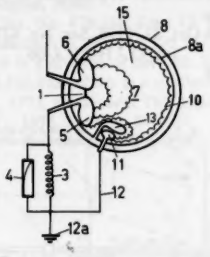
Claims priority, application Switzerland, July 29, 1975, 9845/75

Int. Cl.[2] **H02H** *9/06*

U.S. Cl. 361—134 **4 Claims**

1. An electrical arrester comprising at least one pair of electrodes disposed within an arc quenching chamber and forming a current-limiting quenched spark gap connected in series with an associated blow-out coil for magnetically influencing the arc in said quenching chamber, an auxiliary electrode disposed in said quenching chamber in the vicinity of that one of said electrodes which is conductively connected to one end of said

blow-out coil, and the other end of said blow-out coil being conductively connected to said auxiliary electrode which latter functions to short-circuit said coil during the quenching



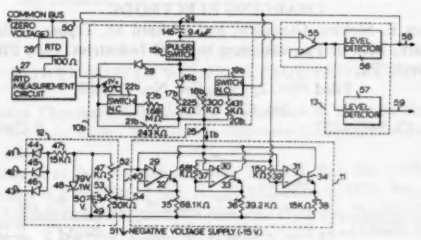
operation, and a screen interposed between said auxiliary short-circuiting electrode and that one of said electrodes which is conductively connected to one end of said blow-out coil.

4,072,997

OVERTEMPERATURE PROTECTIVE CIRCUIT FOR SWITCHING DEVICES

David Richard Boothman, Ennismore; Robert Henry Rehder, and Everett Charles Elgar, both of Peterborough, all of Canada, assignors to Canadian General Electric Company Limited, Toronto, Canada

Filed Oct. 8, 1976, Ser. No. 730,856
Claims priority, application Canada, Dec. 18, 1975, 242342
Int. Cl.[2] H02H *5/04*
U.S. Cl. 361—103 **10 Claims**



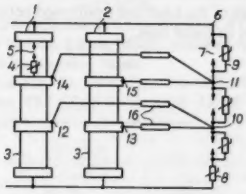
1. A circuit for monitoring the temperature of the contacts of an electrical switching device, said circuit comprising: an electrical, resistance-capacitance analogue circuit of the thermal system of said switching device; at least one switch for modifying said analogue circuit to account for different methods of cooling said switching device; a current controller in series circuit relationship with said analogue circuit for controlling the flow of current through said analogue circuit; a load sensing means, both for obtaining a control signal that is proportional to the magnitude of the current conducted by said switching device, and for applying said signal to said controller for controlling the current conduction thereof; and at least one voltage level detector connected across the capacitance of said analogue circuit for measuring the voltage level thereof, said voltage level being representative of the temperature of the contacts of said switching device.

4,072,998

OVER-VOLTAGE PROTECTION DEVICE

Asle Schei, Trondheim, Norway, assignor to ASEA Aktiebolag, Vasteras, Sweden

Filed Feb. 19, 1976, Ser. No. 659,507
Claims priority, application Sweden, Mar. 18, 1975, 7503020
Int. Cl.[2] H02H *3/22*
U.S. Cl. 361—117 **5 Claims**



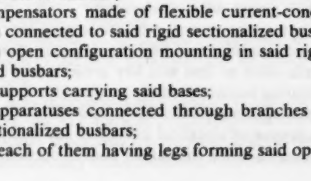
1. Over-voltage protection device comprising a plurality of stacks (1, 2) of series-connected, identical surge arrester sections (3), mutually electrically connected at their upper and lower ends, in which each arrester section (3) comprises an insulating casing containing a voltage-dependent resistor (4) series-connected with a spark gap assembly (5), and a triggering circuit (7, 8, 16) in parallel with the arrester stacks (1, 2), said triggering circuit comprising a plurality of series-connected control spark gaps (7), corresponding to the number of arrester sections (3) in each arrester stack (1, 2), and a triggering resistor (8) connected in series with the control sparks gaps, and cross-sections containing triggering impedances (16) from a connection point (10, 11) between two control spark gaps (7) only to a corresponding connection point (12, 13 and 14, 15, respectively) between two arrester sections (3) of each of the parallel arrester stacks (1, 2), said triggering circuit having a higher resistance and a lower ignition voltage than said arrester stacks.

4,072,999

OUTDOOR HIGH-VOLTAGE SWITCHGEAR ASSEMBLY

Mikhail Yakovlevich Volman, Lunny pereulok, 2, kv. 14; Vladimir Yakovlevich Grinshtein, ulitsa Sverdlova, 132, kv. 31, both of Odessa; Mikhail Leonidovich Zhukov, kvartal 3, dom 28, kv. 5, Kuibyshev; Ivan Anatolievich Kuchuk, ulitsa Engelsa, 36, kv. 1, Odessa, and Evgeny Petrovich Polovinkin, kvartal 1, dom 8, kv. 10, Kuibyshev, all of U.S.S.R.

Filed July 16, 1976, Ser. No. 705,895
Int. Cl.[2] H02B *1/20*
U.S. Cl. 361—333 **7 Claims**



1. An outdoor high-voltage switchgear assembly comprising:

rigid sectionalized busbars;

busbar compensators made of flexible current-conducting members connected to said rigid sectionalized busbars;

bases of an open configuration mounting in said rigid sectionalized busbars;

insulating supports carrying said bases;

electrical apparatuses connected through branches to said rigid sectionalized busbars;

said bases, each of them having legs forming said open con-

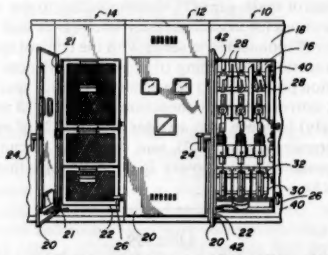
figuration which is substantially U-shaped, said legs being positioned in the planes parallel to the longitudinal axes of the rigid sectionalied busbars, each base being secured on said insulating supports so that the ends of the base legs are higher than the horizontal plane going through the point common for said legs, each said busbar compensator being fastened by its ends to the adjacent sections of the rigid sectionalized busbars, which are secured on the ends of said legs of the base and positioned between the longitudinal axes of these legs.

4,073,000

ELECTRICAL INTERLOCK APPARATUS FOR ELECTRICAL EQUIPMENT

Richard E. Krejsa, Des Plaines, Ill., assignor to S & C Electric Company, Chicago, Ill.

Filed June 30, 1976, Ser. No. 701,065
Int. Cl.² H02B 1/04
U.S. Cl. 361—344 **3 Claims**



1. In metal-enclosed high voltage switchgear including a hollow metal enclosure having an access opening in a side thereof, a hinged door overlying the access opening for preventing access to the interior of the enclosure when closed, a hinged screen door overlying the access opening between the access opening and the hinged door for preventing access to the interior of the enclosure when closed but allowing access to the interior of the enclosure when opened, and electrical components within the interior of the enclosure having a source of electrical energy connected thereto; an improvement comprising:

a switch housing mounted within the enclosure adjacent the access opening, said switch housing having a key opening formed through a front surface of said switch housing facing the access opening;

an electrical switch means mounted within said housing connected between the source of electrical energy and the electrical components for electrically connecting the components when closed and electrically disconnecting the components when opened;

an operating means positioned adjacent said key opening for closing said switch means when engaged and opening said switch means when disengaged;

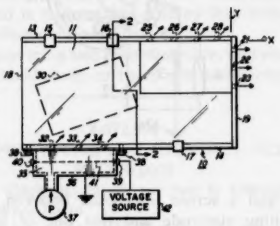
a key projection mounted on the screen door positioned to project through said key opening and thereby align the screen door so that said key projection will engage said operating means when the screen door is closed over the access opening and disengage said operating means so that the source of electrical energy to the components is disconnected when the screen door is opened.

4,073,001

APPARATUS FOR NEUTRALIZING AND REGISTERING AN ELECTROSTATICALLY CHARGED SHEET

Klaus K. Stange, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 31, 1975, Ser. No. 627,641
Int. Cl.² H05F 3/06
U.S. Cl. 361—214 **8 Claims**



1. Apparatus for neutralizing and registering an electrostatically charged rectangular sheet with respect to perpendicularly related theoretical axes, the sheet having a length within predetermined ranges, comprising:

a. a sleeve for internally accommodating said sheet, at least one point on an inner narrow wall of the sleeve being coincident with one of the axes:

b. a stop located at one end of the sleeve, the stop having at least one point coincident with the other of the axes; and

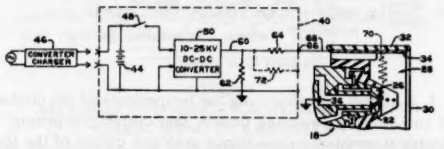
c. means for providing in the sleeve an ionized fluid stream having velocity components normal to each of the axes, whereby when a charged sheet is in the sleeve, the stream neutralizes and moves the sheet into abutment with each of said points said means including an ion source, means for directing a fluid past the ion source and into the sleeve, at least one port in the stop, and at least one port in the narrow wall, said ports providing an exit for fluid in the sleeve.

4,073,002

SELF-ADJUSTING POWER SUPPLY FOR INDUCTION CHARGING ELECTRODE

James E. Sickles, Glenshaw, and Richard M. Tepper, Allison Park, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 2, 1976, Ser. No. 737,889
Int. Cl.² B05B 5/02
U.S. Cl. 361—227 **9 Claims**



1. In an electrostatic induction spray system including a spray nozzle, electrode means adjacent the nozzle and spaced therefrom to define an induction charging zone, and a power supply having a voltage source for supplying a DC voltage to said electrode to produce within said charging zone an electrostatic field which surrounds the discharge ports of said nozzle, the improvement comprising:

control impedance means connected between said voltage source and said electrode means, said control impedance means including a control resistance in effective series circuit relationship with the internal spacial impedance across said charging zone to regulate the voltage applied to said electrode means.

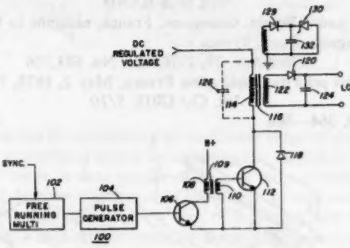
4,073,003
POWER SUPPLY

Derek Chambers, Framingham, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 478,484, June 12, 1974, abandoned, which is a continuation of Ser. No. 291,123, Sept. 21, 1972, abandoned, which is a division of Ser. No. 397,562, Sept. 14, 1973, Pat. No. 3,836,813, which is a continuation of Ser. No. 224,202, Feb. 7, 1972, abandoned. This application Dec. 22, 1975, Ser. No. 643,735

Int. Cl.[2] H02M *3/335*

U.S. Cl. 363—20 **17 Claims**



1. In combination:

a transformer, said transformer having a primary winding and first and second secondary windings;

a single transistor switching element;

means for a DC current to said switching element through said primary winding; and

means for turning said switching element ON and OFF at a predetermined rate, said turning said switching element ON and OFF occurring only when the voltage across said switching element is substantially zero, a high voltage being produced across a load coupled to said first secondary winding when said switching element is OFF and a low voltage being produced across a load coupled to said second secondary winding when said switching element is ON, all input current for producing said high voltage and low voltage flowing through said single transistor switching element.

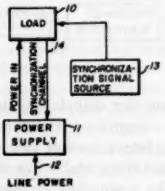
4,073,004
POWER SUPPLY WITH VOLTAGE PROTECTION CIRCUIT

Derek Chambers, Framingham, Mass., and A. Leonard Harley, Norwalk, Conn., assignors to Raytheon Company, Lexington, Mass.

Division of Ser. No. 436,307, Jan. 24, 1974, Pat. No. 3,967,181, which is a division of Ser. No. 34,932, May 6, 1970, Pat. No. 3,818,128. This application Apr. 12, 1976, Ser. No. 676,080

Int. Cl.[2] H02M *7/00*

U.S. Cl. 363—79 **3 Claims**



1. In combination:

a power supply including a synchronizing oscillator;

a voltage detector including first and second sensing circuits for sensing magnitudes of voltage above and below first and second reference magnitudes, said detector comprising an oscillatory circuit producing a cyclical signal in response to a sensed magnitude of said voltage; and

means driven by said cyclical signal for cyclically de-energizing said synchronizing oscillator, thereby turning off said power supply.

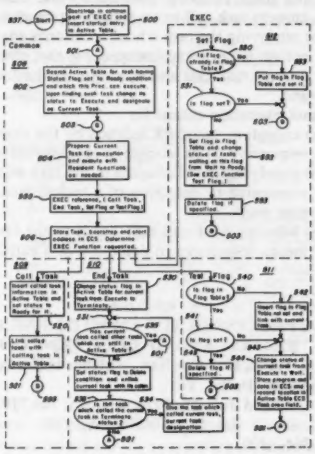
4,073,005
MULTI-PROCESSOR COMPUTER SYSTEM

Thomas Randall Parkin, Edina, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Jan. 21, 1974, Ser. No. 435,356

Int. Cl.[2] G06F *9/18, 9/16, 13/08*

U.S. Cl. 364—200 **9 Claims**



1. Apparatus for processing a plurality of discrete computing tasks, each expressed as a sequence of digital computer instructions, at least one task including a call instruction requesting the performance of a task specified by the call instruction, and at least one task including a task suspension instruction, comprising:

(A) an addressable main memory recording digit sequences contained in a record signal responsive thereto at the address specified by an address signal, and supplying in a data signal the digit sequence recorded at the address specified by the address signal responsive to a retrieve signal, and storing within predetermined areas a plurality of tasks and a task description table specifying the information necessary for activation and execution of each task;

(B) a storage access unit having a plurality of associated pairs of input and output channels, and supplying record, retrieve and address signals to the main memory responsive to record and retrieve-specifying function codes accompanied by data and an address signal on any one of the plurality of input channels; and supplying retrieved data sequences on the output channel associated with the input channel receiving the function code specifying the retrieve function; and

(C) a plurality of local processors whose elements can store and retrieve data in the main memory via a preselected input and output channel pair of the storage access unit, each processor comprising:

(1) an addressable local memory accessible to all other elements of the local processor and including a current task cell;

(2) task activation means receiving a call task signal identifying a task for forming responsive thereto an active table entry specifying the location of the identified task in main memory and containing a multi-state status flag

indicating a ready state, and for issuing signals to the storage access unit causing the active table entry to be stored in an unused area of an active table in the main memory, each said area identified by an associated index;

(3) task selection means for issuing signals to the storage access unit to cause at least one active table entry to be retrieved from the main memory responsive to an idle signal, for examining the status flag in each active table entry retrieved, and for, responsive to the ready state of the status flag in any retrieved active table entry, setting the current task cell to the index of the active table entry having such a status flag, and thereafter issuing signals to the storage access unit for

(a) changing the status flag in the active table entry in the main memory indexed by the contents of the current task cell to an execute state and, next,

(b) retrieving the task whose location is specified by the active table entry indexed by the contents of the current task cell and storing it in the local memory; and

(4) task execution means for

(a) executing each task indexed by the current task cell responsive to its storage in local memory,

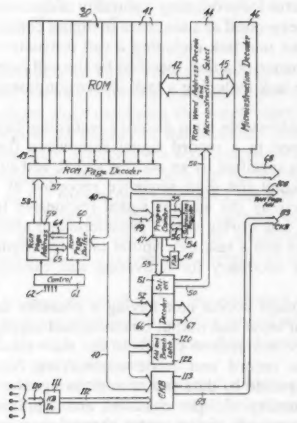
(b) supplying the idle signal to the task selection means responsive to detection of a task suspension instruction, and

(c) supplying the call task signal to the task activation means responsive to detection of a call instruction.

4,073,006
DIGITAL PROCESSOR SYSTEM WITH SIMULTANEOUS BRANCH AND OP CODE FUNCTION

Graham S. Tubbs, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed July 19, 1976, Ser. No. 706,719
Int. Cl.² G06F *9/18, 9/20*
U.S. Cl. 364—200 **8 Claims**

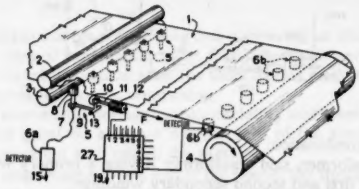


1. An electronic digital processor fabricated in a single LSI semiconductor device, including a large read-only-memory for storing instruction codes of word length of N bits, addressing circuitry for generating addresses having a given number of bits greater than N/2 for the read-only-memory by either sequencing a program counter when a branch instruction is not present or by branching to an address contained in a branch instruction code when present, the processor including an arithmetic unit having an input, a data memory having an output, and logic means responsive to an opcode for controlling transfer of data from the output of said data memory to the input of the arithmetic unit the improvement comprising means for generating an opcode at the same time that a branch instruction code is executed in the addressing circuitry, wherein parts of the branch instruction code used for the branch address also function as said opcode thereby causing data to be transferred from the output of the data memory to the input of the arithmetic unit by said logic means.

4,073,007
METHOD AND APPARATUS FOR MEASURING STRESS IN A BAND SUBJECTED TO TENSION AND APPLICATIONS THEREOF, IN PARTICULAR FOR THE MEASUREMENT OF THE STATE OF PLANARITY OF SUCH A BAND

Pierre André Boivin, Gueugnon, France, assignor to Forges de Gueugnon, Paris, France

Filed Apr. 29, 1976, Ser. No. 681,756
Claims priority, application France, May 2, 1975, 75 13817
Int. Cl.² G01L *5/10*
U.S. Cl. 364—508 **26 Claims**

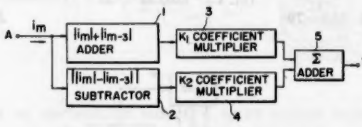


1. A method for measuring the tensile stress in a band subjected to tension, comprising producing a disturbance in the band transversely of the band, measuring the time that said disturbance takes to travel through a predetermined distance along the band, calculating the velocity of propagation c of said disturbance, and calculating the tensile stress σ in the band from the formula $\sigma = p.c.^2$ in which p is the volumic mass of the band.

4,073,008
APPARATUS FOR CALCULATING AMPLITUDE VALUES

Fumio Andow, Hachioji; Tetsuo Matsushima, Fuchu, and Minoru Iwasaki, Kokubunji, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha and Tokyo Denryoku Kabushiki Kaisha, both of, Japan

Filed Aug. 26, 1976, Ser. No. 717,942
Claims priority, application Japan, Aug. 29, 1975, 50-104054; Aug. 29, 1975, 50-104055
Int. Cl.² G06F *15/20;* H03K *5/20*
U.S. Cl. 364—602 **5 Claims**

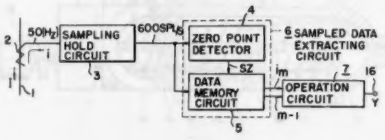


1. An apparatus for calculating the amplitude value of a sinusoidal wave comprising a terminal for receiving signals representing absolute values of two data samples which are sampled from said sinusoidal wave at two points spaced 90° electrical apart by a sampling frequency which is an integer multiple of the frequency of said sinusoidal wave, and operating means coupled to said terminal for receiving said signals representing absolute values of said two data samples and for producing therefrom an electrical signal which is proportional to the amplitude of said sinusoidal wave.

4,073,009
APPARATUS FOR CALCULATING AMPLITUDE VALUES OF SINUSOIDAL WAVES

Fumio Andow, Hachioji; Tetsuo Matsushima, Fuchu, and Minoru Iwasaki, Kokubunji, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha and Tokyo Denryoku Kabushiki Kaisha, both of, Japan

Filed Aug. 26, 1976, Ser. No. 717,939
Claims priority, application Japan, Aug. 29, 1975, 50-104056
Int. Cl.[2] G06F *15/20;* G01R *19/04*
U.S. Cl. 364—602 **14 Claims**

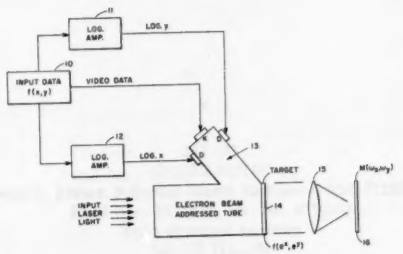


1. Apparatus for calculating an amplitude value of a sinusoidal wave, comprising means for sampling the amplitude of said sinusoidal wave, a data sample extracting circuit including a zero point detector connected to the output of said data sampling means for comparing the sign of a present data sample with that of a data sample immediately preceding said present data sample to produce a zero point detection signal when the compared signs are not equal, circuit means responsive to said zero point detection signal for providing two other data samples sampled by said sampling means at two points spaced from the peak value of said sinusoidal wave, and an operation circuit responsive to the absolute values of said two other data samples for calculating therefrom the amplitude value of said sinusoidal wave.

4,073,010
CORRELATION METHODS AND APPARATUS UTILIZING MELLIN TRANSFORMS

David Paul Casasent, Pittsburgh, Pa., and Demetri Psaltis, Thessaloniki, Greece, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 23, 1976, Ser. No. 707,977
Int. Cl.[2] G06G *7/19, 9/00*
U.S. Cl. 364—822 **8 Claims**



6. A scale and shift invariant optical correlator for processing input and reference data, comprising in combination

a film transparency having recorded therein as variations in its transmittance a pattern which contains the conjugate Mellin transform of said reference data;

means for illuminating said film transparency with a light distribution pattern that corresponds to the Mellin transform of said input data,

said illumination producing a product light distribution pattern which corresponds to that obtained by multiplying the conjugate Mellin transform of the reference data and the Mellin transform of said input data;

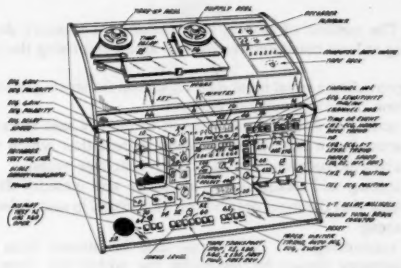
means for Fourier transforming said product light distribution pattern; and

means for recording the results of said Fourier transformation.

4,073,011
ELECTROCARDIOGRAPHIC COMPUTER

Isaac Raymond Cherry, Mission Viejo, and Donald L. Anderson, Huntington Beach, both of Calif., assignors to Del Mar Avionics, Irvine, Calif.

Filed Aug. 25, 1976, Ser. No. 717,651
Int. Cl.[2] A61B *5/04;* G06F *15/42*
U.S. Cl. 364—900 **57 Claims**



1. A dynamic multispeed ECG computer for reproducing ECG information contained on a recording medium recorded at a particular speed, including:

first means for moving the recording medium past at least one fixed predetermined real time readout position and at least one fixed predetermined high speed readout position,

second means coupled to the first means for controlling the first means to move the recording medium at a selected one of a plurality of speeds including the particular speed and including more than one speed appreciably greater than the particular speed, to provide real time and high speed playbacks respectively of the recorded information,

third means located at the fixed predetermined high speed readout position for reproducing the recorded information when the first means moves the recording medium to provide high speed playback,

fourth means located at the fixed predetermined real time readout position for reproducing the recorded information when the first means moves the recording medium to provide real time playback,

fifth means coupled to the third means and responsive to the reproduced signals at high speed playback for producing output signals in accordance with the trend of particular characteristics of the ECG complexes at high speed playback,

sixth means coupled to the third means and responsive to the reproduced signals for producing control signals indicative of the occurrence of the predetermined events within the characteristics of the ECG complexes, and

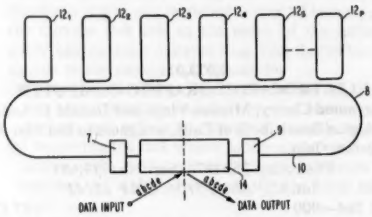
seventh means coupled to the sixth means and the second means and responsive to the control signals provided by the sixth means for controlling the second means to move the recording medium at the real time playback speed upon the occurrence of the predetermined events within the characteristics of the ECG complexes.

4,073,012

FAULT-TOLERANT MEMORY ORGANIZATION

Suran Ohnigian, Upper Darby, Pa., and Jerold A. Seitchik, Dallas, Tex., assignors to Sperry Rand Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 565,894, April 7, 1975, abandoned. This application June 24, 1976, Ser. No. 699,554
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—1 5 Claims



1. The method of storing information in a memory device having at least one defective storage area comprising the steps of,

a. providing a serial input data bit stream for storing information in said memory device;

b. adding bits to said data stream to modify said stream in accordance with predetermined information which indicates the location of said defective storage areas;

c. storing said modified data stream in said memory device such that the input data bits are not stored in said defective areas;

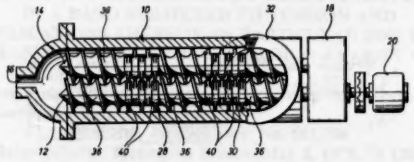
d. recovering said input serial data bit stream from said memory device by removing the added bits from the modified bit stream as read out from the memory device.

4,073,013

SCREW MACHINE FOR HOMOGENIZING MATERIALS OF SOLID, LIQUID AND PASTY CONSISTENCY

Josef A. Blach, Sucystrasse 24, D 7210 Bietigheim, Germany

Filed Nov. 9, 1976, Ser. No. 740,107
Claims priority, application Germany, Nov. 13, 1975, 2550969
Int. Cl.[2] B29B *1/10*
U.S. Cl. 366—83 15 Claims



1. Screw machine for homogenizing solid, liquid and viscous material, having at least two screw shafts engaging with one another and rotatable in an operational direction, each of which comprises a screw section, a core shaft section, and an annular disc on said core shaft section, the shape of the annular disc differing from a circular cylinder concentric to the shaft axis, said annular disc being rotatable relative to the core shaft section in at least the operational direction of rotation of the respective screw shaft to adjust the angular position of said annular disc relative to the respective core shaft,

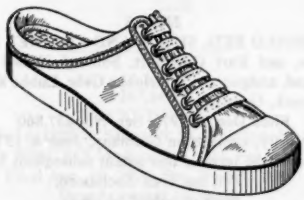
and means for coupling said annular disc with the core shaft section rotating in said operational direction of rotation,

said annular discs of the screw shafts engaging with one another and overlapping one another in radial direction, and having peripheral zones of reduced width in the overlapping region.

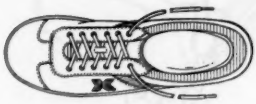
DESIGNS

FEBRUARY 7, 1978

247,136
SHOE
Tetsuro Mizoguchi, Fort Lee, N.J., assignor to Sanyei Corporation, Tokyo, Japan
Filed Mar. 3, 1976, Ser. No. 663,533
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—309

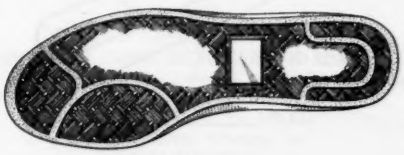


247,137
SPORT SHOE
Morris L. Krome, 9 Roland Mews, Baltimore, Md. 21210
Filed Apr. 23, 1976, Ser. No. 679,830
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—310

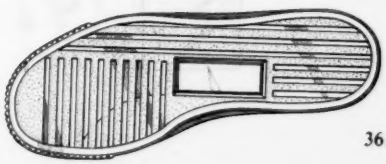


247,138
SPORT SHOE
Morris L. Krome, 9 Roland Mews, Baltimore, Md. 21210
Filed Apr. 28, 1976, Ser. No. 680,974
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—310

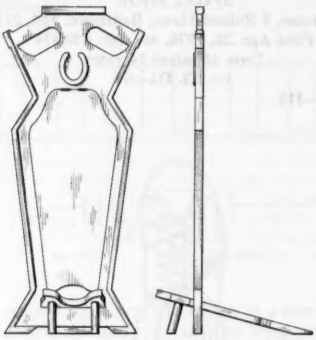
247,139
SHOE SOLE
Leonard Ralph Sorge, Fairfield, Conn., assignor to Eltra Corporation, Wilmington, Mass.
Filed Mar. 25, 1976, Ser. No. 670,536
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—320



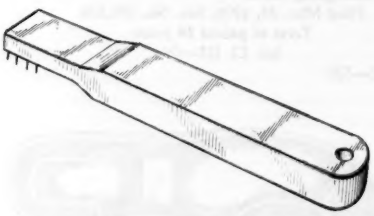
247,140
SHOE SOLE
Leonard Ralph Sorge, Fairfield, Conn., assignor to Eltra Corporation, Wilmington, Mass.
Filed Mar. 25, 1976, Ser. No. 670,537
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—320



247,141
BOOT JACK
G. R. Jack Bailey, 1712 E. 10th, Odessa, Tex. 79761
Filed Dec. 12, 1975, Ser. No. 640,056
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D2—378.2

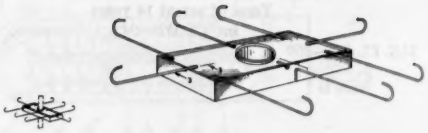


247,142
RIBBON SPLITTING TOOL
Eric Paul Parent, 217 E. Nottingham, Hoffman Estates, Ill. 60195
Filed Jan. 8, 1976, Ser. No. 639,835
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D3—19 R

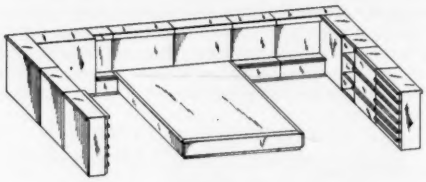


247,143
GUMMED LINT LIFTER
Henry Rivas, 1422 Cable Ave., Hacienda Heights, Calif. 91745
Filed Sept. 7, 1976, Ser. No. 720,714
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—23.1

247,144
RACK FOR DISPLAYING AND STORING PACKAGED MERCHANDISE
Walter Nathan, Glencoe, IL, assignor to RTC Industries, Inc., Chicago, Ill.
Filed Oct. 28, 1975, Ser. No. 626,295
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—85

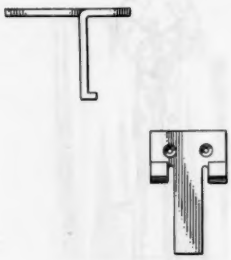


247,145
COMBINED BED, SHELF AND CABINET UNIT
Franz Hero, and Karl Odermatt, both of Hinwil im Tobel, Switzerland, assignors to Interlubke Gebr. Lubke K G, Rheda, Wiedenbruck, Germany
Filed Dec. 4, 1975, Ser. No. 637,860
Claims priority, application Germany, June 4, 1975, 762
The portion of the term of this patent subsequent to Oct. 11, 1991, has been disclaimed.
Term of patent 14 years
Int. Cl. D06—*05*
U.S. Cl. D6—50

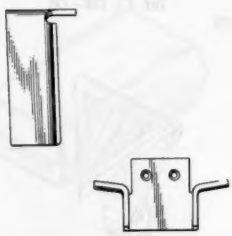


247,146
GARMENT HOOK
William Doyle Watt, Jr., 2820 Leelanau Drive, NE., Grand Rapids, Mich. 49505
Filed Feb. 17, 1976, Ser. No. 658,505
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—122

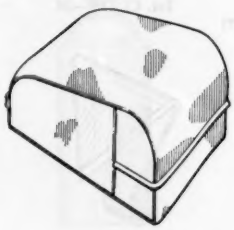
247,147
RACKET RACK
Dennis D. Dicks, 1918 N. Sedgwick St., Chicago, Ill. 60614, and T. William Fejer, 617 Madison St., Oak Park, Ill. 60302
Filed Aug. 19, 1976, Ser. No. 716,007
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—125



247,148
RACKET RACK
Dennis D. Dicks, 1918 N. Sedgwick St., Chicago, Ill. 60614, and T. William Fejer, 617 Madison St., Oak Park, Ill. 60302
Filed Aug. 19, 1976, Ser. No. 716,006
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—125



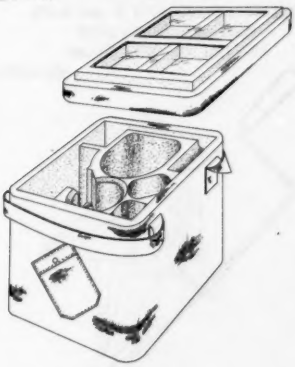
247,149
PHYSICAL THERAPY CUSHION
James N. Woog, 11572 65th Place North, Maple Grove, Minn. 55369
Filed Sept. 12, 1975, Ser. No. 612,706
Term of patent 14 years
Int. Cl. D6—*09*
U.S. Cl. D6—201



247,150
GARMENT HANGER BODY
Everett L. Duester, Holland, Mich., assignor to John Thomas Batts, Inc., Zeeland, Mich.
Filed Aug. 18, 1976, Ser. No. 715,371
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—257

247,151
CONDIMENT SHAKER
James W. McBride, Seattle, Wash., assignor to Fabrik, Inc., Seattle, Wash.
Filed Mar. 26, 1976, Ser. No. 670,731
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—54

247,152
COMBINED CARRIER COOLER AND SEAT
Donald K. Rayfield, No. 9 Crestwood Drive, Oneonta, Ala. 35121
Filed Feb. 18, 1976, Ser. No. 659,121
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D7—77



247,153
COMBINED SPOON AND FORK
Robert P. Julius, Mount Vernon, N.Y., assignor to Nice-Pak Products, Inc., Mount Vernon, N.Y.
Filed Feb. 3, 1976, Ser. No. 654,745
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—148

247,154
CLOTH WRINGER
Gerald J. Curtis, 8806 Glen Loch, Houston, Tex. 77017
Filed Sept. 29, 1975, Ser. No. 617,412
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—161

247,155
HAND HELD CABLE CUTTER
William H. Hayes, P.O. Box 514, Phelham, Ala. 35124
Filed Apr. 23, 1976, Ser. No. 679,766
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—57

247,156
ONE PIECE WALL BRACKET WITH PERFORATED WALL PENETRATING PROJECTION
Richard M. Yensh, 1901 E. Missouri, Phoenix, Ariz. 85016
Filed Aug. 9, 1976, Ser. No. 712,526
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—371

247,157
ONE PIECE WALL BRACKET
Richard M. Yensh, 1901 E. Missouri, Phoenix, Ariz. 85016
Filed Aug. 9, 1976, Ser. No. 712,528
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—371

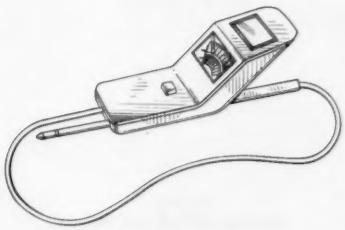
247,158
BOTTLE
Bisked U. Evangelista, 1363 Skyhawk Circle, and Eugenio D. Caburian, 1362 Skyhawk Circle, both of Virginia Beach, Va. 23454
Filed Jan. 15, 1976, Ser. No. 649,572
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—59

247,159
PACKAGING CONTAINER FOR SHOES OR THE LIKE
Juan Carlos Schidlowski, P.O. Box 14, Sedalia, Colo. 80135, and Stephen F. Walker, 2722 S. Oakland Circle East, Denver, Colo. 80323
Filed Dec. 3, 1975, Ser. No. 637,285
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—183

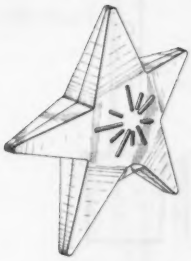
247,160
COMBINED CAN AND CLOSURE
Leonard Thomas LaCroce, Paramus, and Charles Stephan Radtke, Little Ferry, both of N.J., assignors to American Can Company, Greenwich, Conn.
Filed Sept. 29, 1975, Ser. No. 617,400
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—218

247,161
SOUND LEVEL METER
Mario F. Fernandez, and Bruce J. Rubin, both of Minneapolis, Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.
Filed Jan. 30, 1976, Ser. No. 653,653
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—46

247,162
MOISTURE AND LIGHT METER FOR PLANT LIFE
Salvatore Vanasco, Huntington, N.Y., assignor to LMC Data, Inc., Ronkonkoma, N.Y.
Filed Feb. 5, 1976, Ser. No. 655,405
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—56



247,163
FIRE ALARM
Donald A. White, 4701 E. Kessler View, Indianapolis, Ind. 46220
Filed Feb. 9, 1976, Ser. No. 656,617
Term of patent 14 years
Int. Cl. D10—*05*; D11—*05*
U.S. Cl. D10—106

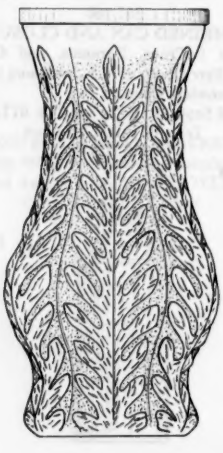


247,164
COMBINED SMOKE DETECTOR AND BAFFLE ASSEMBLY
Benjamin W. Lowell, 45 Log Cabin Drive, Ladue, Mo. 63124
Filed Nov. 22, 1976, Ser. No. 743,844
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106

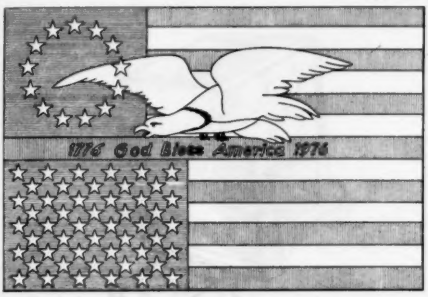
247,165
PLANTER AND SUPPORT THEREFOR
James W. Hart, Sealy, Tex., assignor to Verti-Garden, Inc., Sealy, Tex.
Filed Jan. 27, 1977, Ser. No. 762,859
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—144

247,166
BUD VASE
Arthur L. Harshman, Dunkirk, Ind., and James I. Messmer, Detroit, Mich., assignors to Florists' Transworld Delivery Association
Filed May 17, 1976, Ser. No. 687,185
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—146

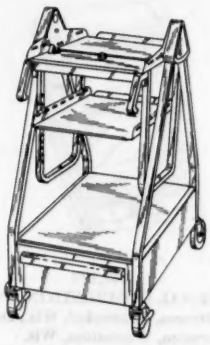
247,167
VASE
Arthur L. Harshman, Dunkirk, Ind., and James I. Messmer, Detroit, Mich., assignors to Florists' Transworld Delivery Association
Filed May 17, 1976, Ser. No. 687,183
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—151



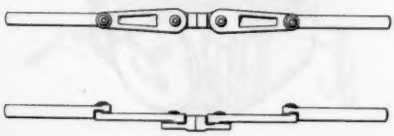
247,168
BICENTENNIAL FLAG
Elizabeth Mattocks, P.O. Box 223, Middlebury, Ind. 46540
Filed Jan. 13, 1976, Ser. No. 648,741
Term of patent 14 years
Int. Cl. D11—*05*
U.S. Cl. D11—173



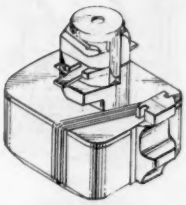
247,169
INSTRUMENT CART
Phillip Weston Sheeley, Aloha, and Howard Michael Meehan, Portland, both of Oreg., assignors to Tektronix, Inc.
Filed July 14, 1976, Ser. No. 705,238
Claims priority, application Japan, Jan. 29, 1976, 51-2482
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—29



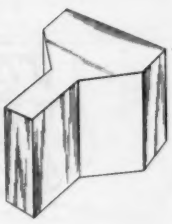
247,170
ADJUSTABLE HANDLEBARS FOR BICYCLE
Larry P. Heber, 188 N. West, Vacaville, Calif. 95688
Filed July 15, 1976, Ser. No. 705,453
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—178



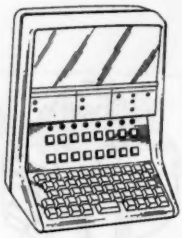
247,171
TRACK LIGHTING SYSTEM FIXTURE CONNECTOR
Hans Peter Berkenhoff, Ludenscheid, Germany, assignor to Lightcraft of California, Los Angeles, Calif.
Filed Mar. 22, 1976, Ser. No. 669,252
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—24



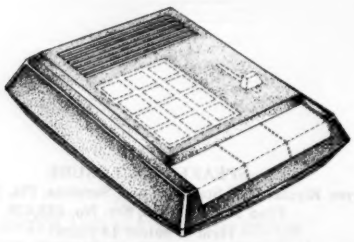
247,172
SPEAKER ENCLOSURE
Warren Ripple, 2839 Sterling Lane, Sarasota, Fla. 33581
Filed Jan. 29, 1976, Ser. No. 653,428
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—33



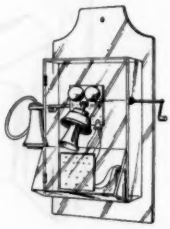
247,173
VEHICLE DATA TERMINAL
Harley D. Peter; Richard D. Miller; David D. Williams, and Fred M. Gore, all of Dallas, Tex., assignors to E-Systems, Inc., Dallas, Tex.
Filed Sept. 7, 1976, Ser. No. 720,729
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—43



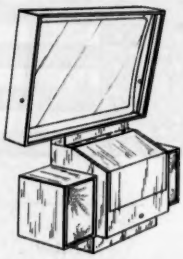
247,174
HOUSING FOR A LOUDSPEAKING TELEPHONE
George M. Janda, Westchester, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.
Filed Feb. 3, 1976, Ser. No. 654,836
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—57



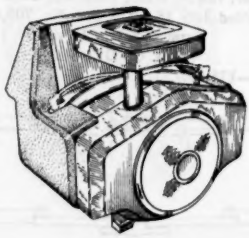
247,175
TRANSISTORIZED RADIO
Gloria Oliney, 6725 Sherbourne Drive, Los Angeles, Calif. 90056
Filed Oct. 6, 1975, Ser. No. 619,959
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—69



247,176
TELEVISION PROJECTION UNIT
LeRoy S. Girson, 9900 Georgia Ave., No. 612, Silver Spring, Md. 20902, and Jack Goldberg, 10919 Breewood Road, Silver Spring, Md. 20901
Filed Jan. 22, 1976, Ser. No. 651,581
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—79

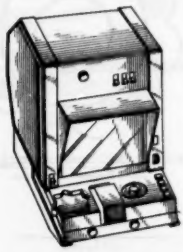


247,177
INTERNAL COMBUSTION ENGINE
Clifford Brooks Stevens, Milwaukee, Wis., assignor to Briggs & Stratton Corporation, Wauwatosa, Wis.
Filed Oct. 29, 1976, Ser. No. 736,853
Term of patent 14 years
Int. Cl. D15—*01*
U.S. Cl. D15—1

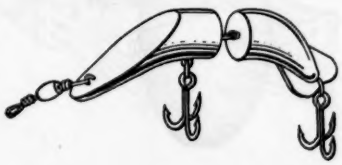


247,178
FILMSTRIP PROJECTOR
Norman R. Kubnick, Skokie, and Dennis J. Erber, Palatine, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.
Continuation-in-part of Ser. No. 539,877, Jan. 9, 1975, abandoned. This application Jan. 7, 1976, Ser. No. 647,294
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D16—14

247,179
MICROFILM READER/PRINTER
Thomas J. Persha, Juneau, Wis., assignor to Bell & Howell Company, Chicago, Ill.
Filed May 4, 1976, Ser. No. 683,131
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—28

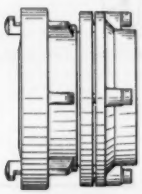


247,180
FISHING LURE
Richard A. Bohan, 136 Leland Way, Tiburon, Calif. 94965
Filed Nov. 22, 1976, Ser. No. 743,986
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

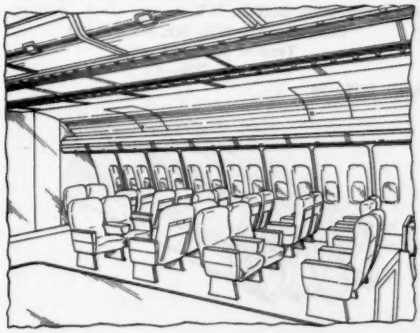


247,181
ARROWHEAD EXTRACTOR
Anthony J. Hoggard, Merrill, Mich., assignor to Tomar Corporation, Indian River, Mich.
Filed Aug. 2, 1976, Ser. No. 710,632
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—99

247,182
COUPLING
Karl Ebert, 7928 Giengen, Brenz, Giengen, Germany
Filed Sept. 4, 1975, Ser. No. 610,149
Claims priority, application Germany, July 31, 1975, 9675
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—44

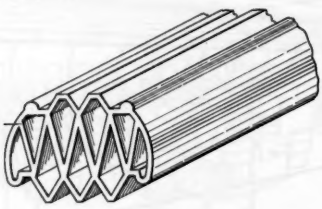


247,183
DISCOTHEQUE BUILDING
James A. Cosentino, Cheektowaga, N.Y., assignor to The Executive, A Motor Hotel of Buffalo, Inc., Buffalo, N.Y.
Filed Dec. 5, 1975, Ser. No. 637,942
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—11

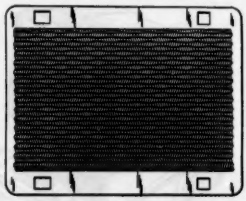


247,184
SHELF SUPPORT POST
Joseph J. Clement, Bradenton, Fla., assignor to The Mead Corporation, Dayton, Ohio
Filed Apr. 29, 1976, Ser. No. 681,549
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—75

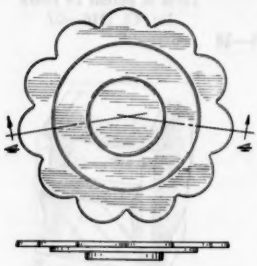
247,185
CONCOURSE SEAL
Guy S. Puccio, Snyder, N.Y., assignor to Acme Highway Products Corporation, Buffalo, N.Y.
Filed June 23, 1976, Ser. No. 698,821
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—75



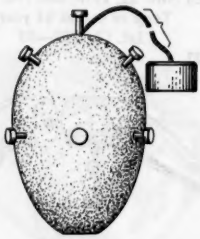
247,186
OUTER BLADE FOR ELECTRIC SHAVER
Satoshi Sakai, Hirakata; Norio Shimizu, Neyagawa, and Junji Nomura, Takatsuki, all of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan
Filed Dec. 31, 1974, Ser. No. 537,685
Claims priority, application Japan, July 4, 1974, 49-22785
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—49



247,187
BIRDBATH BASIN
George J. Hartinger, 3906 Thomas Ave. North, Minneapolis, Minn. 55412
Continuation-in-part of Ser. No. 744,684, Nov. 24, 1976. This application June 2, 1977, Ser. No. 802,953
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—18

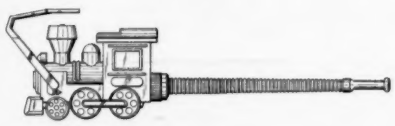


247,188
SPINNING TOY
Barbara J. Callaghan, 5925 Garces Ave., San Jose, Calif. 95123
Filed Oct. 9, 1975, Ser. No. 621,056
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 CT

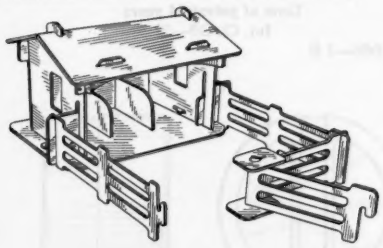


247,189
TENNIS RACKET
Michel Charpentier, Saint-Germain-en-Laye, France, assignor to Ciegeco S.A., Paris, France
Filed Apr. 26, 1976, Ser. No. 680,298
Claims priority, application France, Oct. 24, 1975, 75 74258
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 ST

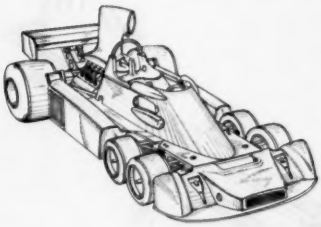
247,190
TOY LOCOMOTIVE
Iesato Watanabe, Misato, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Jan. 22, 1976, Ser. No. 651,237
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 H



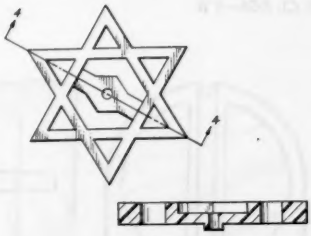
247,191
TOY STABLE AND CORRAL
William Donald Gordon, Sr., Glenview, Ill., assignor to Arvey Corporation
Filed Jan. 28, 1976, Ser. No. 652,904
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 LL



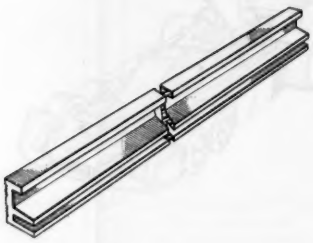
247,192
MODEL RACING CAR
Derek Gardner, West Horsley, England, assignor to Tyrrell Racing Organisation Limited, Woking, England
Filed Sept. 7, 1976, Ser. No. 720,769
Claims priority, application United Kingdom, Mar. 8, 1976, 974802/76
Term of patent 14 years
Int. Cl. D21—*01*; D12—*08*
U.S. Cl. D34—15 AJ



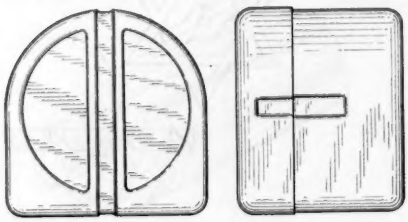
247,193
BUOYANT WICK HOLDER
Donald James Maxwell, London, England, assignor to Rizla Limited, Pontypridd, Wales
Filed May 13, 1976, Ser. No. 685,790
Claims priority, application United Kingdom, Nov. 17, 1975, 973268/75
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D48—2



247,194
CEILING LIGHT FIXTURE DIFFUSER END RAIL
Murray M. Win, 1223 S. Roxbury Drive, Los Angeles, Calif. 90035
Filed Nov. 4, 1976, Ser. No. 738,665
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—16 A

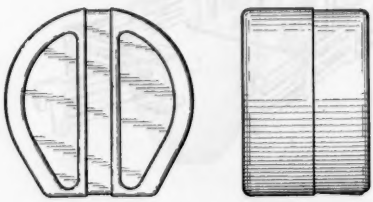


247,195
DRUM CASE
Daniel Stanley Mikosz, Arlington Heights, Ill., assignor to Ludwig Industries, Chicago, Ill.
Filed July 16, 1976, Ser. No. 705,903
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D56—1 B



247,196
DRUM CASE
Daniel Stanley Mikosz, Arlington Heights, Ill., assignor to Ludwig Industries, Chicago, Ill.
Filed July 16, 1976, Ser. No. 705,907
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D56—1 B

247,197
DRUM CASE
Daniel Stanley Mikosz, Arlington Heights, Ill., assignor to Ludwig Industries, Chicago, Ill.
Filed July 16, 1976, Ser. No. 705,908
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D56—1 B

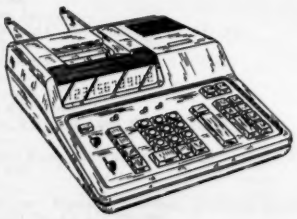


247,198

ELECTRONIC CALCULATING MACHINE

Yoshihisa Ohie, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed July 30, 1976, Ser. No. 710,335
Claims priority, application Japan, Feb. 5, 1976, 51-3618
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 B



247,199

INFANT CARRIER

Kathleen T. Carter, 4307 Fifth St., Riverside, Calif. 92501

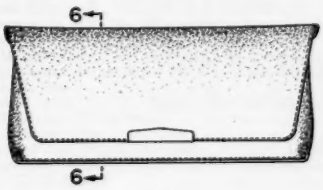
Filed Feb. 20, 1976, Ser. No. 659,692
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 A

247,200

SPECTACLE CASE

Robert Marks, 761 Montague Ave., San Leandro, Calif. 94577

Filed Jan. 5, 1977, Ser. No. 757,078
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—9



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TO WHOM

PATENTS WERE ISSUED ON THE 7TH DAY OF FEBRUARY, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. E. Staley Manufacturing Company: *See—*
Short, Rolland W. P.; and Verbanac, Frank, 4,072,535, Cl. 106-210.000.

A. F. Industries, Inc.: *See—*
Finney, Donald C., 4,072,626, Cl. 252-389.00A.

A/S GYRO: *See—*
Lillkvist, Salomo, 4,072,359, Cl. 302-34.000.

A. Stucki Company: *See—*
Wiebe, Donald, 4,072,112, Cl. 105-221.00K.

AB Gylling & Co.: *See—*
Heidergren, Lars, 4,072,986, Cl. 360-12.000.

AB Kabi: *See—*
Arwin, Hans Rune; and Lundstrom, Kurt Ingemar, 4,072,576, Cl. 195-103.50R.

Abe, Keiji: *See—*
Tomita, Shigeru; Matsuda, Yoshindo; Terajima, Kazuki; and Abe, Keiji, 4,072,794, Cl. 428-378.000.

Abe, Masahiro, to Glory Kogyo Kabushiki Kaisha. Coin sorting device. 4,072,156, Cl. 133-3.00F.

ACF Industries, Incorporated: *See—*
Kemp, Willard E., 4,072,126, Cl. 116-125.000.

Adams, Ladd M., to Entek Corporation. Rotary valve with spring biased valve member. 4,072,291, Cl. 251-181.000.

Addmaster Corporation: *See—*
Clary, John G., 4,072,919, Cl. 335-257.000.

Adelstein, Gilbert W.; Dajani, Esam Z.; and Yen, Chung Hwai, to G. D. Searle & Co. 1-(3,3,3-Triarylalkyl)-4-phenyl-piperidinealkanols. 4,072,686, Cl. 260-293.690.

Advance Machine Corporation: *See—*
Lodge, Robert H., 4,072,187, Cl. 165-48.000.

AFA Corporation, The: *See—*
Steyns, Emile B.; and Miller, Jerry H., 4,072,252, Cl. 222-341.000.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Ter-Minassian, Leon, 4,072,050, Cl. 73-190.00R.

Agency of Industrial Science and Technology of Japan: *See—*
Tomita, Shigeru; Matsuda, Yoshindo; Terajima, Kazuki; and Abe, Keiji, 4,072,794, Cl. 428-378.000.

AGFA-Gevaert Aktiengesellschaft: *See—*
Koleff, Boris; and Hofmann, Wilfried, 4,072,860, Cl. 250-216.000.
Winkler, Alfred, 4,072,970, Cl. 354-187.000.

AGFA-GEVAERT, N.V.: *See—*
Pollet, Robert Joseph; Sels, Francis Jeanne; and Vandeputte, Camille Angelina, 4,072,523, Cl. 96-22.000.
Sels, Jeanne Francis Jeanne; Pollet, Robert Joseph; Vandeputte, Camille Angelina; and Willems, Jozef Frans, 4,072,526, Cl. 96-66.300.

Aglitsky, Vladimir Efimovich: *See—*
Kovanov, Pavel Vasilievich; Torochkov, Ivan Mikhailovich; Zonenko, Ivan Timofeevich; Alexandrov, Adolf Moritsovich; Aglitsky, Vladimir Efimovich; Tsimbler, Jury Abramovich; Kantor, Ilya Solomonovich; Topolyansky, Jury Arnoldovich; and Lurie, Mikhail Vladimirovich, 4,072,109, Cl. 104-138.00R.

Aichi Steel Works, Limited: *See—*
Morita, Kazuo; Asano, Seiichi; and Masuma, Shigeharu, 4,071,958, Cl. 33-178.00B.

Air Industrie: *See—*
Carre, Christian; Guibet, Jean-Pierre; Rebours, Albert; and Rigal, Andre, 4,072,484, Cl. 55-379.000.

Air-Tex Wire Harness, Inc.: *See—*
Burkhart, James G.; Burkhart, Montgomery P.; and Coley, James D., 4,072,381, Cl. 339-29.00R.

Aisin Seiki Kabushiki Kaisha: *See—*
Kondo, Toshiyuki, 4,072,366, Cl. 303-116.000.

Ajinomoto Co., Inc.: *See—*
Togo, Kazushi; Tamura, Fumihide; Yasuda, Naohiko; Ichikawa, Takehiko; Sano, Konosuke; Matsuda, Keizo; and Mitsugi, Koji, 4,072,687, Cl. 260-306.70T.

Akademie der Wissenschaften der Deutschen Demokratischen Republik: *See—*
Ferse, Armin; and Grimm, Harald, 4,072,591, Cl. 204-159.200.

Akebono Brake Industry Co., Ltd.: *See—*
Inoue, Takehisa; Ogawa, Yutaka; Sugita, Hiroaki; and Watanabe, Namio, 4,072,217, Cl. 188-73.600.

Akerson, David Wallace, to Conwed Corporation. Non-combustible hardboard sheet. 4,072,558, Cl. 162-145.000.

Aktiebolaget Svenska Kullagerfabriken: *See—*
Perdahl, Orn Gunnar; and Santen, Sven Oscar, 4,072,504, Cl. 75-40.000.

Aktiebolaget Tudor: *See—*
Nilsson, Ove, 4,071,946, Cl. 29-623.100.

A.G. fur industrielle Elektronik: *See—*
Ullmann, Werner; and Buhler, Ernst, 4,072,842, Cl. 219-69.00C.

Akzona Incorporated: *See—*
Oosterwijk, Hendrik H. J.; Magre, Eduard P.; and Beyleveld, Wilhelmus M., 4,072,811, Cl. 526-346.000.

Aldred, Edward John, to Ransomes Sims & Jefferies Limited. Mowing machines. 4,072,001, Cl. 56-7.000.

Aldridge, Clifton; Gibson, Sandra F.; and Rodgers, Gregory D., to McDonnell Douglas Corporation. *Pseudomonas aeruginosa* broth. 4,072,573, Cl. 195-100.000.

Alexandrov, Adolf Moritsovich: *See—*
Kovanov, Pavel Vasilievich; Torochkov, Ivan Mikhailovich; Zonenko, Ivan Timofeevich; Alexandrov, Adolf Moritsovich; Aglitsky, Vladimir Efimovich; Tsimbler, Jury Abramovich; Kantor, Ilya Solomonovich; Topolyansky, Jury Arnoldovich; and Lurie, Mikhail Vladimirovich, 4,072,109, Cl. 104-138.00R.

Alig, Craig S., to United States of America, Navy. Ozone reactor for liquids. 4,072,613, Cl. 210-198.00R.

Alivoivodich, Miro Khristoforovich: *See—*
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.

Allen, Robert M., to National Semiconductor Corporation. Stripe on strip plating method. 4,072,581, Cl. 204-15.000.

Allied Chemical Corporation: *See—*
Berenbaum, Morris B.; Evans, Francis E.; Eibeck, Richard E.; and Robinson, Martin A., 4,072,027, Cl. 62-112.000.
Cipris, Divna; and Pouli, Dirk, 4,072,584, Cl. 204-73.00R.
Cooksey, James Judson; and Turner, Garland Linwood, 4,072,457, Cl. 425-192.00S.
Loomba, Yogendra Singh, 4,071,929, Cl. 24-230.00A.
Nychka, Henry Robert; Eibeck, Richard Elmer; Robinson, Martin Alvin; and Jones, Edward Stephen, 4,072,726, Cl. 260-633.000.
Pendlebury, David, 4,072,663, Cl. 260-75.00M.

Allis-Chalmers Corporation: *See—*
Hansen, Kenneth N., 4,072,357, Cl. 301-1.000.
Vaughan, Warren R., 4,072,238, Cl. 214-15.00E.

Alongi, Anthony V., to Calspan Corporation. Apparatus for the detection of buried objects. 4,072,942, Cl. 343-5.0NA.

Alsberg, Dietrich Anselm, to Bell Telephone Laboratories, Incorporated. Fault inspection system. 4,072,427, Cl. 356-241.000.

Alt, Robert M.: *See—*
Butterfield, Max E.; Alt, Robert M.; and March, James E., 4,072,331, Cl. 292-173.000.

Aluminum Pechiney: *See—*
Morel, Paul; and Dugois, Jean-Pierre, 4,072,597, Cl. 204-243.00M.

Alvarez-Calderon, Alberto. Tunnel support structure and method. 4,072,018, Cl. 61-35.000.

Amano, Yoshinari: *See—*
Motoyoshi, Kenya; Kume, Masahiro; and Amano, Yoshinari, 4,072,515, Cl. 75-173.00A.

Amato, Carmelo J.: *See—*
Symons, Philip C.; and Amato, Carmelo J., 4,072,540, Cl. 429-70.000.

Amax Inc.: *See—*
Coldren, Arthur P.; Tither, Geoffrey; and Doane, Douglas V., 4,072,543, Cl. 148-12.00F.
Rajcevic, Harold P.; Opie, William R.; and Cusanelli, Dominic C., 4,072,507, Cl. 75-74.000.

Amberg, Ralph G.: *See—*
Amberg, Stephen; and Amberg, Ralph G., 4,072,549, Cl. 156-86.000.

Amberg, Stephen; and Amberg, Ralph G., to Owens-Illinois, Inc. Method and apparatus for fabricating thermoplastic containers. 4,072,549, Cl. 156-86.000.

American Air Filter Company, Inc.: *See—*
Mutchler, Paul A., 4,072,329, Cl. 285-187.000.

American Cyanamid Company: *See—*
Asato, Goro; and Bentley, Terence James, 4,072,711, Cl. 260-554.000.
Grosso, Vincent Gerard, 4,072,707, Cl. 260-521.00C.
Hermann, David Trimble, 4,072,466, Cl. 8-183.000.
Hoffman, John Ronald; and Marsland, Peter John, 4,072,041, Cl. 72-416.000.
Schiller, Arthur Maurice; Goodman, Richard Martin; and Neff, Roger Edgar, 4,072,607, Cl. 210-58.000.

American Cystoscope Makers Inc.: *See*—
Hett, John H., 4,072,147, Cl. 128-006.000.
American Home Products Corporation: *See*—
Sellstedt, John H., 4,072,676, Cl. 260-239.100.
American Hydrotherm Corporation: *See*—
Hinkle, Richard E., 4,072,184, Cl. 165-18.000.
American Radiologic Systems, Inc.: *See*—
Craig, James R.; and Nerge, Steven F., 4,072,865, Cl. 250-409.000.
Amesbury, Maurice G. Camera periscope with louvers for controlling light scattering. 4,072,406, Cl. 350-173.000.
Amess, Colin Lawrence, to Xerox Corporation. Electrostatographic reproduction methods and machines. 4,072,413, Cl. 355-3.0CH.
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Barton, Robert D., 4,072,894, Cl. 324-221.000.
Sacchetti, Peter John, 4,072,921, Cl. 338-61.000.
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AMP Incorporated: *See*—
Shannon, Suel Grant, 4,072,376, Cl. 339-17.00C.
Amtsberg, Lester A., to Chicago Pneumatic Tool Company. Hydraulic rock drill. 4,072,198, Cl. 173-10.000.
Anderson, Arnold L., to Velsicol Chemical Corporation. Plastic compositions. 4,072,652, Cl. 260-45.75B.
Anderson, Donald L.: *See*—
Cherry, Isaac Raymond; and Anderson, Donald L., 4,073,011, Cl. 364-900.000.
Anderson, Jon A.; and Malin, Wendell R., to Cardiac Pacemakers, Inc. Sealing arrangement for heart pacer electrode leads. 4,072,154, Cl. 128-419.00P.
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Johnson, Ben C.; Thornton, J. Scott; Glowe, Donald E.; Cassidy, Patrick E.; and Anderson, Robert E., 4,072,848, Cl. 219-528.000.
Anderson, Stig Lennart. Apparatus for indicating liquid level in a receptacle. 4,072,053, Cl. 73-303.000.
Anderson, Warren Malcolm; and Shaffran, Clifford John, to Clifford Industries PTY., Ltd. Yacht mast. 4,072,121, Cl. 114-90.000.
Andow, Fumio; Matsushima, Tetsuo; and Iwasaki, Minoru, to Tokyo Shibaura Denki Kabushiki Kaisha; and Tokyo Denryoku Kabushiki Kaisha. Apparatus for calculating amplitude values. 4,073,008, Cl. 364-602.000.
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Andress, Harry J., Jr., to Mobil Oil Corporation. Metal working lubricant. 4,072,618, Cl. 252-46.600.
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Antar Petroles de l'Atlantique: *See*—
Patouillet, Jean Joseph Nicolas, 4,072,601, Cl. 208-134.000.
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Roberts, David J.; and Mauri, Jacinto Moragues, 4,072,747, Cl. 424-270.000.
Aoki, Makoto; and Nishiyama, Tadao, to Nisshin Oil Mills, Ltd., The; and JGC Corporation. Continuous deodorizing apparatus of fat and oil. 4,072,482, Cl. 55-195.000.
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Applegate, Leslie T., to Surgical Appliance Industries, Inc. Portable weight lifting type forearm exerciser. 4,072,308, Cl. 272-117.000.
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White, James F.; Shaw, Wilfrid G.; and Applequist, Michael D., 4,072,708, Cl. 260-530.00N.
Apuzzio, Joseph J.: *See*—
Pelosi, Marco Antonio; and Apuzzio, Joseph J., 4,072,144, Cl. 128-2.00S.
Araki, Kunio; Sasaki, Takashi; Kasahara, Yuko; Yamashita, Yoshisada; Yotumoto, Keiichi; Sunaga, Hiromi; Tabei, Kiyoshi; Goto, Kazuo; Tajiri, Kunio; and Kittaka, Hirokama, to Nitto Boseki Co., Ltd.; and Japan Atomic Energy Research Institute. Fiber reinforced plastic flat plates. 4,072,792, Cl. 428-246.000.
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Ardemagni, Loyce A., to Eastman Kodak Company. Hot melt pressure sensitive adhesives. 4,072,735, Cl. 260-897.00A.
Armco Steel Corporation: *See*—
Schultheiss, Adrian, 4,072,118, Cl. 113-57.000.
Armstrong Cork Company: *See*—
Barrall, Jeffery L.; and Reed, William R., 4,072,533, Cl. 106-84.000.
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Arnold, Frank, Jr., to Kollmorgen Technologies Corporation. Direct drive for turntables. 4,072,874, Cl. 310-268.000.
Arnstein, Bennett. Kite bracket. 4,072,284, Cl. 244-153.00R.
Artemenko, Stanislav Arsentievich: *See*—
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.
Arvan, John. Indicating apparatus for measuring the pressure of a fluid within a container. 4,072,048, Cl. 73-146.800.
Arwin, Hans Rune; and Lundstrom, Kurt Ingemar, to AB Kabi. Method for studying enzymatic and other biochemical reactions. 4,072,576, Cl. 195-103.50R.
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Watanabe, Itaru; Yamakoshi, Yasumichi; Miyauchi, Hirotsugu; Tsushima, Sakae; and Fukumoto, Mitsunobu, 4,072,793, Cl. 428-255.000.
Asano, Seiichi: *See*—
Morita, Kazuo; Asano, Seiichi; and Masuma, Shigeharu, 4,071,958, Cl. 33-178.00B.
Asano, Seiji, to Fuji Photo Optical Co., Ltd. Photographic camera with built-in generator. 4,072,966, Cl. 354-60.00R.
Asato, Goro; and Bentley, Terence James, to American Cyanamid Company. Tetrahydro-4-semicarbazono-1-naphthylureas. 4,072,711, Cl. 260-554.000.
Aschwanden, Felix, to RCA Corporation. SECAM identification circuit. 4,072,983, Cl. 358-19.000.
ASEA Aktiebolag: *See*—
Schei, Asle, 4,072,998, Cl. 361-117.000.
Ashida, Kaneyoshi; Ohtani, Masaaki; and Ohkubo, Shoichi, to Mitsubishi Chemical Industries Limited. Process for preparing smoke-retardant polyisocyanurate foam. 4,072,636, Cl. 260-2.5AW.
Astafiev, Anatoly Alexandrovich: *See*—
Zorev, Nikolai Nikolaevich; Astafiev, Anatoly Alexandrovich; Loboda, Alexandr Sergeevich; Savukov, Vladimir Pavlovich; Runov, Andrei Efimovich; Belov, Vladimir Alexandrovich; Sobolev, Jury Vasilievich; Sobolev, Valentin Vasilievich; Pavlov, Nikolai Mikhailovich; Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Balandin, Jury Fedorovich; Gorynin, Igor Vasilievich; Zvezdin, Jury Ivanovich; Ivanov, Kuzma Makeevich; Ignatov, Viktor Alexandrovich; and Emelyanenko, July Georgievich, 4,072,509, Cl. 75-124.000.
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Borchert, Alfred E.; and Kremer, Charles J., 4,072,634, Cl. 260-2.50A.
Atomic Energy of Canada Limited: *See*—
Pauluis, Gerard J. C. A., 4,072,469, Cl. 23-260.000.
Auer, Josef. Safety device for use in a vehicle having a seat. 4,072,348, Cl. 297-386.000.
Automated Medical Systems, Inc.: *See*—
Thelander, Paul F., 4,072,605, Cl. 210-50.000.
Automotive Products Limited: *See*—
Hales, Eric Charles, 4,072,361, Cl. 303-6.00C.
Avdeev, Mikhail Pavlovich: *See*—
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.
Aveneau, Andre Auguste, to Scholeman-Siemag Aktiengesellschaft. Pulse stuffing demand generating device. 4,072,826, Cl. 179-15.0AF.
Babcock & Wilcox Company, The: *See*—
Jabsen, Felix S., 4,072,564, Cl. 176-76.000.
McDonald, Bertrand N.; and Schluderberg, Donald C., 4,072,563, Cl. 176-65.000.
Sankovich, Melvin F., 4,072,562, Cl. 176-50.000.
Bachelder, Albert J.: *See*—
Land, Edwin H.; Bachelder, Albert J.; and Perry, Sarah H., 4,072,968, Cl. 354-86.000.
Bactomatic Corporation: *See*—
Cady, Paxton; Omura, Takeshi; Rudin, Melvin; and Fleming, James H., 4,072,578, Cl. 195-127.000.
Baer, Karl: *See*—
Voges, Dieter; Baer, Karl; Boudier, Juergen; Winderl, Siegfried; and Hoffmann, Herwig, 4,072,714, Cl. 260-584.00R.
Baer, Martin Alfred, to Illinois Tool Works Inc. Method of producing drill screws. 4,071,918, Cl. 10-10.00R.
Bagnasco, Dante Victor. Molded safety pin. 4,071,927, Cl. 24-156.000.
Baizer, Manuel M.: *See*—
Hallcher, Richard C.; Baizer, Manuel M.; and White, Donald A., 4,072,583, Cl. 204-59.00R.
Bala Electronics Corporation: *See*—
Grier, John D., Sr., 4,072,771, Cl. 427-96.000.
Balandin, Jury Fedorovich: *See*—
Zorev, Nikolai Nikolaevich; Astafiev, Anatoly Alexandrovich; Loboda, Alexandr Sergeevich; Savukov, Vladimir Pavlovich; Runov, Andrei Efimovich; Belov, Vladimir Alexandrovich; Sobolev, Jury Vasilievich; Sobolev, Valentin Vasilievich; Pavlov, Nikolai Mikhailovich; Paton, Boris Evgenievich; Medovar,

Boris Izrailevich; Balandin, Jury Fedorovich; Gorynin, Igor Vasilievich; Zvezdin, Jury Ivanovich; Ivanov, Kuzma Makeevich; Ignatov, Viktor Alexandrovich; and Emelyanenko, July Georgievich, 4,072,509, Cl. 75-124.000.

Balda-Werke Photographische Gerate und Kunststoff GmbH & Co. KG.: *See*—
Cheavin, Michael, 4,072,969, Cl. 354-166.000.
Meixner, Willi, 4,072,960, Cl. 354-60.00L.

Balducci, Agostino: *See*—
Beranger, Alessandro; Balducci, Agostino; and Gordini, Silvano, 4,072,739, Cl. 423-8.000.

Balfanz, Fred: *See*—
Pfeuffer, Alfred; Rudolf, Herbert; and Balfanz, Fred, 4,072,300, Cl. 266-50.000.

Balland, Jean, to Manufacture de Produits Chimiques Protex. Epoxypropyl ammonium salt and boric acid assisted dyeing process. 4,072,464, Cl. 8-84.000.

Bally Manufacturing Corporation: *See*—
Lucero, Andres R.; Gilbert, Roy E.; and Stevens, Jack H., 4,072,930, Cl. 340-152.00T.

Balston, John C., to Rucker Company, The. Mooring and release device. 4,072,122, Cl. 114-230.000.

Ban, Itsuki. Axial-air-gap type semiconductor electric motor. 4,072,881, Cl. 318-138.000.

Banon, Gabriel J. C., to Societe Industrielle d'Etudes et de Realisations Scientifiques S.I.E.R.S. Diaphragm valve. 4,072,292, Cl. 251-331.000.

Barbareschi, Aldo. Fluid pressure actuated operator cylinder with incorporated stress converter. 4,072,013, Cl. 60-563.000.

Barber, Walter G.: *See*—
Loxley, Ted A.; Barber, Walter G.; Combs, Walter W.; and Webb, John M., 4,072,489, Cl. 65-18.000.

Barker, Joseph K. Trailer construction. 4,072,337, Cl. 296-27.000.

Barlow, George J.; and Nibby, Chester M., Jr., to Honeywell Information Systems Inc. Apparatus and method for storing parity encoded data from a plurality of input/output sources. 4,072,853, Cl. 235-312.000.

Barnaby, Bernard Sydney; Coe, Cyril Walter; Hall, Godfrey Stephen; and Leworthy, John Harwood, to General Electric Company Limited, The. Printing devices. 4,072,224, Cl. 197-1.00R.

Barrall, Jeffery L.; and Reed, William R., to Armstrong Cork Company. Lightweight, non-cementitious building material. 4,072,533, Cl. 106-84.000.

Bartel, Wieland: *See*—
Kleeberg, Wolfgang; Rubner, Roland; and Bartel, Wieland, 4,072,524, Cl. 96-35.100.

Bartel, William J.; and Burton, Robert S., III, to Occidental Oil Shale, Inc. Multi-stage method of operating an in situ oil shale retort. 4,072,350, Cl. 299-2.000.

Bartels, Hermann; Schurmann, Werner; and Sigg, Max, to Mettler Instruments AG. Sample preparation device. 4,072,275, Cl. 241-79.000.

Barthel, Werner: *See*—
Herweg, Peter; and Barthel, Werner, 4,072,788, Cl. 428-139.000.

Barton, David W., to Ford Motor Company. Dual function heater core. 4,072,186, Cl. 165-43.000.

Barton, James Brockman: *See*—
Buss, Dennis Darcy; Emmons, Stephen P.; and Barton, James Brockman, 4,072,978, Cl. 357-24.000.

Barton, Robert D., to AMF Incorporated. Rotating pipeline inspection apparatus. 4,072,894, Cl. 324-221.000.

BASF Aktiengesellschaft: *See*—
Daeuble, Manfred, 4,072,465, Cl. 8-169.000.
Halbritter, Guenter; Muehlthaler, Wolfgang; Sperber, Heinrich; Diem, Hans; Dudeck, Christian; and Lehmann, Gunter, 4,072,717, Cl. 260-603.00C.
Voges, Dieter; Baer, Karl; Boudier, Juergen; Winderl, Siegfried; and Hoffmann, Herwig, 4,072,714, Cl. 260-584.00R.

BASF Wyandotte Corporation: *See*—
Langdon, William K., 4,072,704, Cl. 260-463.000.
Vogt, Herwart Curt; Parekh, Manher; Cenker, Moses; and Patton, John Thomas, Jr., 4,072,631, Cl. 252-431.00R.

Bastian, Jean-Michel: *See*—
Ebnother, Anton; Bastian, Jean-Michel; Gadient, Fulvio; and Stoll, Andre, 4,072,756, Cl. 424-267.000.

Bate & Ramey, Inc.: *See*—
Seyle, Robert Alan, 4,072,040, Cl. 72-406.000.

Bate, Robert T.; and Caywood, John Millard, to Texas Instruments Incorporated. Read only memory utilizing charge coupled device structures. 4,072,977, Cl. 357-24.000.

Bates, P. A.; Folsom, L. R.; and Haberstroh, A. J., to General Electric Company. Recoil converter. 4,072,082, Cl. 89-162.000.

Batson, Paul E., to Crown American Irrigation, Inc. Irrigation system. 4,072,205, Cl. 180-66.00R.

Bauer, Benjamin B., to CBS Inc. Microphone system for producing signals for quadraphonic reproduction. 4,072,821, Cl. 179-1.0GQ.

Baumgartl, Ulrich: *See*—
Kuenzle, Paul; and Baumgartl, Ulrich, 4,072,832, Cl. 200-48.00R.

Baxter Travenol Laboratories, Inc.: *See*—
Frederick, Warren Phillip, 4,072,128, Cl. 118-3.000.

Bayer Aktiengesellschaft: *See*—
Herweg, Peter; and Barthel, Werner, 4,072,788, Cl. 428-139.000.
Hinsche, Friedrich; and Schaupp, Kurt, 4,072,786, Cl. 428-537.000.
Kubens, Rolf, 4,072,649, Cl. 260-37.00N.
Meisert, Ernst; and Fischer, Peter, 4,072,712, Cl. 260-566.00R.
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,072,500, Cl. 71-98.000.
Walther, Herbert; Hartig, Wolfgang; Friedrich, Adolf; and Raue, Roderich, 4,072,911, Cl. 331-94.50L.

BBC Brown, Boveri & Company Limited: *See*—
Bischofberger, Walter; and Mauthe, Gerhard, 4,072,836, Cl. 200-144.0AP.
Niemeyer, Lutz; and Ragaller, Klaus, 4,072,838, Cl. 200-148.00R.
Rudolph, Rene, 4,072,996, Cl. 361-134.000.

Beam, Dale R. Control apparatus for a card game simulator. 4,072,310, Cl. 273-1.00E.

Beard, Colin C.; Edwards, John A.; and Fried, John H., to Syntex (U.S.A.) Inc. 5(6)-Benzene ring substituted benzimidazole-2-carbamate derivatives having anthelmintic activity. 4,072,696, Cl. 260-397.600.

Beatrice Foods Co.: *See*—
Williams, Wilmore, 4,072,570, Cl. 195-100.000.

Becdelievre, Charles; Kaiser, Victor; and Paradowski, Henri, to Compagnie Francaise d'Etudes et de Construction - Technip. Method of and arrangement for processing through low temperature heat exchanges and in particular for treating natural gases and cracked gases. 4,072,485, Cl. 62-23.000.

Bechtle, Bastian; Schuenemann, Claus; Skudelny, Gisbert; Spruth, Wilhelm; Weis, Helmut; and Zimmermann, Volker, to International Business Machines Corporation. Method of controlling a stepper motor. 4,072,888, Cl. 318-685.000.

Beck, Erich. Spiral-line press for thermoplastic synthetics. 4,072,455, Cl. 425-133.100.

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Rampel, Hans; Hess, Peter; and Becker, Herbert, 4,071,978, Cl. 49-348.000.

Becker, Otto Alfred. Construction unit. 4,071,992, Cl. 52-223.00R.

Becker, Werner; and Schrotz, Kurt. Label printing and dispensing apparatus. 4,072,105, Cl. 101-288.000.

Beecham Group Limited: *See*—
Box, Stephen John, 4,072,569, Cl. 195-80.00R.
Callander, Sidney Edward, 4,072,677, Cl. 260-239.100.

Beisel, Hermann: *See*—
Junghans, Rudi; and Beisel, Hermann, 4,072,106, Cl. 101-425.000.

Beiter, Glenn A., to Honeywell Inc. Bi-directional motor drive servo. 4,072,883, Cl. 318-257.000.

Bell & Howell Company: *See*—
Watson, Charles J., 4,072,419, Cl. 355-83.000.

Bell Telephone Laboratories, Incorporated: *See*—
Alsberg, Dietrich Anselm, 4,072,427, Cl. 356-241.000.
Chu, William Wing-Yen, 4,072,937, Cl. 340-324.00M.
DeWinter, John Christian; Nahory, Robert Edward; and Pollack, Martin Alan, 4,072,544, Cl. 148-171.000.
Fraser, David Bruce; and Kammlott, Guenther Wilhelm, 4,072,768, Cl. 427-34.000.
Gitlin, Richard Dennis; and Thompson, John Stewart, 4,072,830, Cl. 179-170.200.

Bellehache, Pierre; and Le Troadec, Yves, to Pont-A-Mousson S.A. Valve structure for a spraying container. 4,072,162, Cl. 137-71.000.

Belov, Vladimir Alexandrovich: *See*—
Zorev, Nikolai Nikolaevich; Astafiev, Anatoly Alexandrovich; Loboda, Alexandr Sergeevich; Savukov, Vladimir Pavlovich; Runov, Andrei Efimovich; Belov, Vladimir Alexandrovich; Sobolev, Jury Vasilievich; Sobolev, Valentin Vasilievich; Pavlov, Nikolai Mikhailovich; Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Balandin, Jury Fedorovich; Gorynin, Igor Vasilievich; Zvezdin, Jury Ivanovich; Ivanov, Kuzma Makeevich; Ignatov, Viktor Alexandrovich; and Emelyanenko, July Georgievich, 4,072,509, Cl. 75-124.000.

Benbow, Eugene C., to Westinghouse Electric Corporation. Meter encoding register having an improved pointer shaft assembly. 4,072,267, Cl. 235-112.000.

Bendix Corporation, The: *See*—
Ewald, Jerome T., 4,072,011, Cl. 60-555.000.
Gardner, Delbert J., 4,072,014, Cl. 60-575.000.
Pauwels, Edward M., 4,072,365, Cl. 303-115.000.
Waldron, Clifford R.; Yonkers, Karl W.; Goebeler, Robert; Frear, David L.; and Bright, Edward J., 4,072,394, Cl. 339-276.00T.

Benjamin, Jack W.: *See*—
Hirshaut, Yashar, 4,072,577, Cl. 195-104.000.

Benthake, Heinrich, to WGW Westdeutsche Getriebe- und Kupplungswerke GmbH. Planetary gearing with closed housing. 4,072,067, Cl. 74-789.000.

Bentley Engineering Company Limited, The: *See*—
Harlow, David Arthur; and Wood, Gillies, 4,072,029, Cl. 66-154.00R.

Bentley, Terence James: *See*—
Asato, Goro; and Bentley, Terence James, 4,072,711, Cl. 260-554.000.

Benzon, William. Method of cleaning raw ore. 4,072,539, Cl. 134-25.00R.

Beranger, Alessandro; Balducci, Agostino; and Gordini, Silvano, to Snamprogetti, S.p.A. Process for the removal of uranium contained in homo- and co-polymers of mono- and diolefines. 4,072,739, Cl. 423-8.000.

Berenbaum, Morris B.; Evans, Francis E.; Eibeck, Richard E.; and Robinson, Martin A., to Allied Chemical Corporation. Stabilized heat activated heat exchange absorption pair. 4,072,027, Cl. 62-112.000.

Berezhnoi, Ivan Arkhipovich: *See*—
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Ku-

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Berg, Philip R. Inhibiting spray dispersion: method and apparatus. 4,072,269, Cl. 239-1.000.

Berger, Henry D., to Kimberly Rose Company, Inc. Hand truck with retractable frame. 4,072,319, Cl. 280-47.37R.

Berglund, Kjell: *See*—
Nordlund, Karl Signar; and Berglund, Kjell, 4,072,086, Cl. 91-418.000.

Bergwerksverband GmbH: *See*—
Busbach, Willi, 4,072,239, Cl. 214-35.00R.

Bermudez Munoz, Francisco, to Diego Zamora S.A. Modular display device. 4,072,235, Cl. 211-71.000.

Bertin & Cie: *See*—
Sagner, Max; and Souquet, Jacques, 4,072,170, Cl. 137-599.000.

Bertucci, Shirley J. Index finger positioning device for tennis racket handles. 4,072,311, Cl. 273-75.000.

Bessho, Satoshi: *See*—
Muto, Kiyoshi; Hisada, Toshihiko; Ohmori, Nobutsugu; Bessho, Satoshi; Mori, Naoharu; and Ishikawa, Katsuhiko, 4,071,996, Cl. 52-741.000.

Betschart, Antoinette A., to United States of America, Agriculture. Preparation of protein isolates from safflower seeds. 4,072,669, Cl. 260-123.500.

Beyerstedt, Ronald: *See*—
Coyle, John D., 4,072,511, Cl. 75-130.00R.

Beyleveld, Wilhelmus M.: *See*—
Oosterwijk, Hendrik H. J.; Magre, Eduard P.; and Beyleveld, Wilhelmus M., 4,072,811, Cl. 526-346.000.

Bezdek, Milan: *See*—
Hrabak, Frantisek; Bezdek, Milan; Hynkova, Vlasta; and Bouchal, Karel, 4,072,805, Cl. 526-43.000.

Bianchi, Giuseppe; de Nora, Vittorio; Gallone, Patrizio; and Nidola, Antonio, to Diamond Shamrock Technologies S.A. Valve metal electrode with valve metal oxide semi-conductive coating having a chlorine discharge catalyst in said coating. 4,072,585, Cl. 204-98.000.

Bianco, Joseph F.; Senio, Nicholas; Hawes, Russell B.; and Strang, Donald B., to Sanders Associates, Inc. Imminent collision detection apparatus. 4,072,944, Cl. 343-7.0PF.

Bieganski, Zdzislaw. Wire stripping tools. 4,072,069, Cl. 81-9.50A.

Big Elk Wood Corporation: *See*—
Smitherman, Stephen N.; and Dougherty, Lemuel A., 4,072,094, Cl. 100-3.000.

Bijlmer, Paul Frederik Adriaan, to Fokker-VFW B.V. Apparatus for measuring the electron escape potential of metal surfaces. 4,072,896, Cl. 324-61.00P.

Billings, William G., to Phillips Petroleum Company. Methods of converting ditertiary organic sulfides to ditertiary organic disulfides. 4,072,718, Cl. 260-608.000.

Birkestrand, Orville J. Machine for cutting pipe and tubing. 4,072,073, Cl. 82-92.000.

Birnkraut, Hans-Walter: *See*—
Feichtinger, Hans; Lutze, Siegfried; Birnkraut, Hans-Walter; and Kluy, Werner, 4,072,659, Cl. 260-57.00A.

Bischofberger, Walter; and Mauthe, Gerhard, to BBC Brown, Boveri & Company Limited. Electrical switch with means for switching an auxiliary resistance into the circuit controlled thereby. 4,072,836, Cl. 200-144.0AP.

Bishop, Richard T., to Revertex (South Africa) (Proprietary) Limited. Soil treatment method. 4,072,020, Cl. 61-36.00C.

Bjornson, Geir, to Phillips Petroleum Company. Method for separating tetraalkylammonium salts. 4,072,713, Cl. 260-567.60M.

Blach, Josef A. Screw machine for homogenizing materials of solid, liquid and pasty consistency. 4,073,013, Cl. 366-83.000.

Black, Christopher T.; and Lear, Anthony, to Texas Instruments Incorporated. Fast switching Darlington circuit. 4,072,981, Cl. 357-46.000.

Black, John W., to Pemco-Kalamazoo, Inc. Wheel construction. 4,072,373, Cl. 308-191.000.

Blackmon, Anthony D.: *See*—
Miller, Walter E., Jr.; Sitton, Robert L.; and Blackmon, Anthony D., 4,072,281, Cl. 244-3.160.

Blazek, George A.: *See*—
Smith, Garland Y.; Scott, Gerald R.; Blazek, George A.; and Kowalski, John L., 4,072,437, Cl. 407-118.000.

Block, Thomas S., to Clarke-Gravely Corporation. Sweeper. 4,071,920, Cl. 15-49.00C.

Blouin, Michel; and Mercier, Leo. Combined pacifying nipple and mouth thermometer device. 4,072,054, Cl. 73-343.00R.

Blount, David H. Process for the production of polyurethane resins and foams utilizing silico-formic acid. 4,072,637, Cl. 260-2.5AM.

Blum, Jean, to Chimie & Biologie. Thiol esters of homocysteine. 4,072,703, Cl. 260-455.00R.

BOC Limited: *See*—
Buckingham, Herbert Charles; and Elliott, Raymond, 4,072,845, Cl. 219-146.300.

Bock, Erik, to Superfos Emgallage A/S. Method of mounting a handle on a pail. 4,071,939, Cl. 29-434.000.

Boeing Company, The: *See*—
Weiland, Richard Herschel, 4,072,283, Cl. 244-135.00A.

Bogdan, Raymond G.: *See*—
Fletcher, C. Hugh; Bogdan, Raymond G.; Wright, Robert W.; and Cheuvront, Robert M., 4,072,103, Cl. 101-151.000.

Bogorad, Alissa Pam. Device for applying or removing support stockings. 4,072,255, Cl. 223-111.000.

Boguth, Walter; Leuenberger, Hans Georg Wilhelm; Mayer, Hans Johann; Widmer, Erich; and Zell, Reinhard, to Hoffmann-La Roche Inc. Optically active cyclohexane derivatives. 4,072,715, Cl. 260-586.00R.

Bohler, Hans; and Griesser, Rolf, to Sandoz Ltd. Azomethine copper complexes. 4,072,700, Cl. 260-438.100.

Boillot, Pierre Gerard, to Institut de Recherches de la Siderurgie Francaise Irsid; and Instruments S.A. Furnace for melting metal by the Joule effect. 4,072,814, Cl. 13-20.000.

Boisset, Bernard, to Societe Industrielle Bertrand Faure Brieres-les-Scelles. Seat sliding runner. 4,072,347, Cl. 297-385.000.

Boivin, Pierre Andre, to Forges de Gueugnon. Method and apparatus for measuring stress in a band subjected to tension and applications thereof, in particular for the measurement of the state of planarity of such a band. 4,073,007, Cl. 364-508.000.

Bolis, Gary W. Mechanic's stand. 4,072,209, Cl. 182-116.000.

Bollinger, Frederic G.; and D'Amico, John J., to Monsanto Company. Use of pyridyl phthalimides as plant growth regulants. 4,072,499, Cl. 71-94.000.

Bolton, Wilbur Monroe: *See*—
Conant, Louis A.; Bolton, Wilbur Monroe; and Wilson, James Ellsworth, 4,072,243, Cl. 215-12.00R.

Bonnety, Gerard: *See*—
Boulet, Jean-Claude; Walraevens, Rene; Bonnety, Gerard; Lolivier, Jacques; and Trouillet, Paul, 4,072,638, Cl. 260-2.5AP.

Boone, Jack L., to Snap-on Tools Corporation. Drawer slide assembly with tapered runner. 4,072,375, Cl. 312-338.000.

Boothman, David Richard; Rehder, Robert Henry; and Elgar, Everett Charles, to Canadian General Electric Company Limited. Overtemperature protective circuit for switching devices. 4,072,997, Cl. 361-103.000.

Borchert, Alfred E.; and Kremer, Charles J., to Atlantic Richfield Company. Production of polyurethane foams from modified polyester polyol prepolymers. 4,072,634, Cl. 260-2.50A.

Borg-Warner Corporation: *See*—
Sheth, Rajesh N., 4,072,452, Cl. 418-266.000.

Bosche, Eugene R., to Ex-Cell-O Corporation. Two station sonic sealing apparatus and method. 4,072,089, Cl. 93-44.1GT.

Bost, Howard W., to Phillips Petroleum Company. Flame-retarded polyolefin blend with good balance of properties. 4,072,643, Cl. 260-23.00H.

Bouchal, Karel: *See*—
Hrabak, Frantisek; Bezdek, Milan; Hynkova, Vlasta; and Bouchal, Karel, 4,072,805, Cl. 526-43.000.

Boudier, Juergen: *See*—
Voges, Dieter; Baer, Karl; Boudier, Juergen; Winderl, Siegfried; and Hoffmann, Herwig, 4,072,714, Cl. 260-584.00R.

Bouillon, Claude; and Rosenbaum, Georges, to L'Oreal. Aluminum derivatives of 2-pyridyl thiol N-oxide, process for preparing the same and antiperspirant-deodorant composition containing the same. 4,072,742, Cl. 424-47.000.

Boulet, Jean-Claude; Walraevens, Rene; Bonnety, Gerard; Lolivier, Jacques; and Trouillet, Paul, to Solvay & Cie. Halogenated polyether polyols and polyurethane foams produced therefrom. 4,072,638, Cl. 260-2.5AP.

Bourns, Inc.: *See*—
Munson, Ramon Jon; Hurd, Claude Calvert; and Weigl, James, 4,072,148, Cl. 128-142.200.

Bowes, Peter. Core and beam suspension system for a building construction and method of construction. 4,071,988, Cl. 52-127.000.

Bowles, Romald E. System for articulate drying and transport. 4,071,960, Cl. 34-57.00A.

Box, E. O., Jr.: *See*—
Farha, Floyd, Jr.; and Box, E. O., Jr., 4,072,608, Cl. 210-63.00R.

Box, Stephen John, to Beecham Group Limited. Preparation of clavulanic using *Streptomyces jumonjinensis*. 4,072,569, Cl. 195-80.00R.

Boyd-Dunlop, Percy. Disc cultivator with curved spacer structure. 4,072,197, Cl. 172-349.000.

Bradley, Charles Duane, Jr., to Pneumo Corporation. Poppet relief valve. 4,072,165, Cl. 137-493.000.

Braker, Frederick Williams; Heckman, Russell William; Nickey, George Allen; and Potter, Terry Clair, to Owens-Illinois, Inc. Apparatus controlling shrinkage of a sleeve wrap on a container. 4,072,553, Cl. 156-423.000.

Brand, Derek A.: *See*—
Terzian, Rouben T.; and Brand, Derek A., 4,072,429, Cl. 401-146.000.

Brandstatter, Hans G.: *See*—
Smellie, Allan M.; and Brandstatter, Hans G., 4,072,510, Cl. 75-130.500.

Bratt, Martin Daniel, to Du Pont de Nemours, E. I., and Company. Oxygen barrier layers for photopolymerizable elements. 4,072,528, Cl. 96-87.00R.

Brattesani, Alan Joseph, to Lee Pharmaceuticals. Dioxolane derivatives and use as photoinitiators. 4,072,694, Cl. 260-340.90R.

Braun, Egon, to Maschinenfabrik Niehoff KG. Wire drawing machines. 4,072,038, Cl. 72-289.000.

Braunlinger, Konrad: *See*—
Heiser, Joachim; Hoheisel, Rainer; Flaschar, Heinz; Gand, Heinz; Kleinschmidt, Heinz; Braunlinger, Konrad; Sopha, Klaus;

Schempp, Roland; and Sanzenbacher, Hermann, 4,072,169, Cl. 137-596.130.

Braunschweigische Maschinenbauanstalt: *See*—
Dietzel, Walter; and Matusch, Siegfried, 4,071,961, Cl. 34-108.000.
Dietzel, Walter, 4,072,266, Cl. 233-2.000.

Brazeway, Inc.: *See*—
Zolman, Junior O.; and Griewahn, Carl O., 4,071,934, Cl. 29-157.30A.

Brenner, Bernd: *See*—
Fahn, Rudolf; Brenner, Bernd; and Buckl, Hans, 4,072,538, Cl. 127-37.000.

Bright, Alfred William; Overton, Michael Anthony Mersham; and Parker, Ian Frederick, to National Research Development Corporation. Electrostatic powder deposition. 4,072,129, Cl. 118-629.000.

Bright, Donald Ray: *See*—
Bright, Jerd; and Bright, Donald Ray, 4,072,325, Cl. 280-772.000.

Bright, Edward J.: *See*—
Waldron, Clifford R.; Yonkers, Karl W.; Goebeler, Robert; Frear, David L.; and Bright, Edward J., 4,072,394, Cl. 339-276.00T.

Bright Engineering, Incorporated: *See*—
Bright, Jerd; and Bright, Donald Ray, 4,072,325, Cl. 280-772.000.

Bright, Jerd; and Bright, Donald Ray, to Bright Engineering, Incorporated. Pendulum stabilized ground vehicles. 4,072,325, Cl. 280-772.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Sugiyama, Akira; Yamamoto, Yoshikazu; and Yamada, Shiro, 4,072,114, Cl. 112-121.120.

Brouwer, Frans, to Stewart-Warner Corporation. Tracing head and drive. 4,072,301, Cl. 266-60.000.

Brown, Donald J., to Knox Manufacturing Co. Control mechanism for positioning projection screen in closed position. 4,072,404, Cl. 350-117.000.

Brown, James D.: *See*—
Uraneck, Carl A.; and Brown, James D., 4,072,807, Cl. 526-48.100.

Brown, Michael A.; and Mol, Hans C., to Pitney-Bowes, Inc. Collator system. 4,072,304, Cl. 270-58.000.

Brown & Williamson Tobacco Corporation: *See*—
Hammersmith, James R., 4,072,789, Cl. 428-195.000.

Brueckner, Keith A.; and Lewis, John H., to Xonics, Inc. Axial tomography. 4,072,289, Cl. 250-445.00T.

Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna. Charge for manufacturing aluminium-silicon alloys. 4,072,512, Cl. 75-148.000.

Brysch, Gottfried, to Eppendorf Geratebau Netheler & Hinz GmbH. Slip-on pipette tip member and pipette device therefor. 4,072,330, Cl. 285-239.000.

Buchanan, James E., to Westinghouse Electric Corporation. Bucket brigade analog-to-digital converter. 4,072,938, Cl. 340-347.0AD.

Buckingham, Herbert Charles; and Elliott, Raymond, to BOC Limited. Welding electrode. 4,072,845, Cl. 219-146.300.

Buckl, Hans: *See*—
Fahn, Rudolf; Brenner, Bernd; and Buckl, Hans, 4,072,538, Cl. 127-37.000.

Budmiger, Hermann, to Revue Thommen AG. Light filter for welder's mask. 4,071,912, Cl. 2-8.000.

Buendia, Jean; Vivat, Michel; and Schalbar, Jeanine, to Roussel UCLAF. Novel cyclopentanoic acid derivatives. 4,072,755, Cl. 424-312.000.

Buhler, Ernst: *See*—
Ullmann, Werner; and Buhler, Ernst, 4,072,842, Cl. 219-69.00C.

Bulang, Siegfried: *See*—
Regehr, Ulrich; and Bulang, Siegfried, 4,072,478, Cl. 55-440.000.

Bullough, Vaughn L.; and Daley, Luther O., to Reynolds Metals Company. Carbon electrodes having stabilized binders derived from the entire organic fraction of bituminous coal. 4,072,599, Cl. 204-294.000.

Bunker Ramo Corporation: *See*—
Cameron, John Keith; and Krolak, Ronald Francis, 4,072,383, Cl. 339-59.00R.

Bunnomori, Yukinari: *See*—
Nakata, Tetsuya; Yamada, Nobuo; Hashimoto, Akira; Takata, Yasuto; and Bunnomori, Yukinari, 4,072,734, Cl. 260-873.000.

Buran, Vojtech; and Horn, Vladimir, to Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi. Loom with means for shed forming. 4,072,175, Cl. 139-455.000.

Burant, Leonard Joseph; and Daley, James Thomas, to Globe-Union Inc. Deferred action battery having improved bottom port cover. 4,072,801, Cl. 429-110.000.

Burgdorf, Jochen; Eikenberg, Dieter; Stoka, Roberto; and Marianu, Vlod, to ITT Industries, Incorporated. Spot type disc brake for a pair of independent yoke biasing spring elements. 4,072,215, Cl. 188-72.400.

Burke, Courtney L., to Eisner, Albert M., a part interest. Fluid type inertia switch having resettable plunger and cone shaped retainer. 4,072,835, Cl. 200-61.470.

Burkhart, James G.; Burkhart, Montgomery P.; and Coley, James D., to Air-Tex Wire Harness, Inc. Tractor-trailer electrical connector system. 4,072,381, Cl. 339-29.00R.

Burkhart, Montgomery P.: *See*—
Burkhart, James G.; Burkhart, Montgomery P.; and Coley, James D., 4,072,381, Cl. 339-29.00R.

Burlington Industries, Inc.: *See*—
James, Forrest T.; and Guy, Stephen L., 4,072,775, Cl. 427-373.000.

Burns, Thagrus A. Clippings catcher for a hedge trimmer. 4,071,951, Cl. 30-132.000.

Burton, Robert S., III: *See*—
Bartel, William J.; and Burton, Robert S., III, 4,072,350, Cl. 299-2.000.

Busbach, Willi, to Bergwerksverband GmbH; and Didier Engineering GmbH. Arrangement for charging a furnace in a gastight and dust-tight manner. 4,072,239, Cl. 214-35.00R.

Buschmann, Gerhard; and Spohr, Reinhard, to Jagenberg-Werke AG. Apparatus for adjusting the mutual distances of several elements arranged side by side, particularly pairs of blades for the straight-line cutting of sheet material. 4,072,887, Cl. 318-675.000.

Buss, Dennis Darcy; Emmons, Stephen P.; and Barton, James Brockman, to Texas Instruments Incorporated. CCD input and node preset method. 4,072,978, Cl. 357-24.000.

Butler, Robert J. Electrical connector. 4,072,402, Cl. 339-136.00M.

Butterfield, Max E.; Alt, Robert M.; and March, James E., to Caterpillar Tractor Co. Door latch having three-way actuation means. 4,072,331, Cl. 292-173.000.

Byers, Jimmy F. Deep towing cable and handling system. 4,072,123, Cl. 114-254.000.

Bylo, John J. Marine transport. 4,072,120, Cl. 114-72.000.

Byrnes, Francis R. Tamperproof lock with shock absorber. 4,072,163, Cl. 137-296.000.

C.C. Egelhaaf, Firma: *See*—
Wagner, Theodor, 4,072,174, Cl. 139-54.000.

C.G. Conn, Ltd.: *See*—
Shallenberger, Larry R.; and Southard, James S., 4,072,078, Cl. 84-1.030.

C-R-O, Inc.: *See*—
Pfeuffer, Alfred; Rudolf, Herbert; and Balfanz, Fred, 4,072,300, Cl. 266-50.000.

Cachin, Roland: *See*—
Witmer, Kurt; and Cachin, Roland, 4,072,889, Cl. 323-9.000.

Cady, Paxton; Omura, Takeshi; Rudin, Melvin; and Fleming, James H., to Bactomatic Corporation. Multi-chambered module for use in monitoring growth of microorganisms. 4,072,578, Cl. 195-127.000.

Caflisch, Jerry A., to Pako Corporation. Roller drive assembly for photographic processors. 4,072,061, Cl. 74-67.000.

Calderon, Albert. Method and apparatus for basic oxygen steel making employing the off-gas principle of pre-heating purposes. 4,072,299, Cl. 266-44.000.

Caldwell, William Joseph: *See*—
Weiss, Stefan Adam; Torney, Harry Lester; and Caldwell, William Joseph, 4,072,565, Cl. 195-1.100.

Calgon Corporation: *See*—
Sinha, Rabindra Kumar; Wagner, Norman J.; and Joyce, Ronald S., 4,072,479, Cl. 55-73.000.
Wagner, Norman J., 4,072,480, Cl. 55-73.000.

Callander, Sidney Edward, to Beecham Group Limited. Penicillin synthesis. 4,072,677, Cl. 260-239.100.

Callerhorn, Bo Allan: *See*—
Kohli, Martti Ilmari; Eklund, Fjalar Ernst Erik; and Callerhorn, Bo Allan, 4,072,092, Cl. 99-389.000.

Calspan Corporation: *See*—
Alongi, Anthony V., 4,072,942, Cl. 343-5.0NA.

Cameron, John Keith; and Krolak, Ronald Francis, to Bunker Ramo Corporation. Electrical connector insert retention assembly. 4,072,383, Cl. 339-59.00R.

Camp, Roger D.: *See*—
Servin, Arturo; and Servin, Jose, 4,072,042, Cl. 72-457.000.

Camp, William J. Apparatus and method for calculating vehicle movement parameters. 4,072,849, Cl. 235-61.0NV.

Campbell, Monty A. Timing display ignition plate assembly. 4,072,891, Cl. 324-16.00T.

Campbell, Willis R.; and Waldrop, Thomas W., to Sperry Rand Corporation. Twine wrapping mechanism for a roll forming machine. 4,072,095, Cl. 100-5.000.

Canada-Cities Service, Ltd.: *See*—
Kizior, Thaddeus Eugene, 4,072,609, Cl. 210-73.00R.

Canada, Her Majesty the Queen in right of, as represented by the Minister of Energy, Mines and Resources: *See*—
Kizior, Thaddeus Eugene, 4,072,609, Cl. 210-73.00R.

Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See*—
Hamid, Michael A.; and Sandoz, Oscar A., 4,072,941, Cl. 343-5.0NA.

Canadian General Electric Company Limited: *See*—
Boothman, David Richard; Rehder, Robert Henry; and Elgar, Everett Charles, 4,072,997, Cl. 361-103.000.

Canella, Marco: *See*—
Sodini, Giancarlo; and Canella, Marco, 4,072,671, Cl. 260-123.500.

Canon Denshi Kabushiki Kaisha: *See*—
Takashima, Hideo, 4,072,994, Cl. 360-124.000.

Canon Kabushiki Kaisha: *See*—
Hirata, Noritsugu; Takigawa, Tomoshi; and Ishikawa, Kazuo, 4,072,409, Cl. 352-174.000.
Kitajima, Tadayuki; and Tohyama, Yoshikuni, 4,072,211, Cl. 185-40.00R.
Suda, Masashi; and Kubo, Shunichi, 4,072,412, Cl. 355-3.0TR.
Takashima, Hideo, 4,072,994, Cl. 360-124.000.

Tanaka, Nobuyoshi; Takeda, Mitsuo; and Matsumoto, Kazuya, 4,072,422, Cl. 356-108.000.
Capitol Hardware Manufacturing Company, Inc.: *See*—
Levy, Paul M., 4,072,432, Cl. 403-170.000.
Cardiac Pacemakers, Inc.: *See*—
Anderson, Jon A.; and Malin, Wendell R., 4,072,154, Cl. 128-419.00P.
Carena, Ugo, to Ing. C. Olivetti & C., S.p.A. Keyboard selector switch assembly for a calculating machine. 4,072,833, Cl. 200-5.00R.
Carl Canzler, Firma: *See*—
Kranz, Berthold, 4,072,298, Cl. 266-44.000.
Carlson, Elmer Carl, to T & H Mfg. Co., Inc. Hoe attachment for edgers. 4,072,195, Cl. 172-15.000.
Carlson, Robert E., to TRW Inc. Pump assembly. 4,072,450, Cl. 418-133.000.
Carre, Christian; Guibet, Jean-Pierre; Rebours, Albert; and Rigal, Andre, to Air Industrie. Bag filter. 4,072,484, Cl. 55-379.000.
Carroll, Luther E.; and Clement, James C., to General Motors Corporation. Hydraulic pressure brake system with spring apply pressure release parking brake mode. 4,072,360, Cl. 303-2.000.
Carson, Don B., to UOP Inc. Power generation and potable water recovery from salinous water. 4,072,579, Cl. 203-11.000.
Carswell, Robert: *See*—
Williams, Dennis A.; and Carswell, Robert, 4,072,619, Cl. 252-47.500.
Carter, Russell P., Jr.: *See*—
Creekmore, Mark D.; Vielhaber, Edward T.; and Carter, Russell P., Jr., 4,072,790, Cl. 428-220.000.
Casasent, David Paul; and Psaltis, Demetri, to United States of America, Navy. Correlation methods and apparatus utilizing mellin transforms. 4,073,010, Cl. 364-822.000.
Case, William John Philip; and Commander, Robert Duncan, to International Business Machines Corporation. Servo positioning system for data storage apparatus. 4,072,990, Cl. 360-77.000.
Casner, Paul G.; and McDevitt, Edward J., to United States of America, Navy. Presettable rate multiplier. 4,072,904, Cl. 328-39.000.
Cassidy, Patrick E.: *See*—
Johnson, Ben C.; Thornton, J. Scott; Glowe, Donald E.; Cassidy, Patrick E.; and Anderson, Robert E., 4,072,848, Cl. 219-528.000.
Castine, William A., Jr., to PPG Industries, Inc. Glass bending lehr with pre-heat hood. 4,072,492, Cl. 65-107.000.
Catalyst Research Corporation: *See*—
Schneider, Alan Arthur, 4,072,803, Cl. 429-181.000.
Caterpillar Tractor Co.: *See*—
Butterfield, Max E.; Alt, Robert M.; and March, James E., 4,072,331, Cl. 292-173.000.
Goloff, Alexander, 4,072,088, Cl. 92-220.000.
Griffith, Bobby D., 4,072,324, Cl. 280-759.000.
Habiger, Cyril W., 4,072,167, Cl. 137-535.000.
Isaia, Robert L., 4,072,332, Cl. 292-228.000.
Klett, Gene R., 4,071,967, Cl. 37-141.00T.
Lawrence, Dean M.; and Simpson, Fred E., 4,072,338, Cl. 296-28.00C.
Lee, Emil B., 4,071,965, Cl. 37-4.000.
Meza, Gonzalo Dario Vidal, 4,072,343, Cl. 297-93.000.
Mueller, James P., 4,072,087, Cl. 91-461.000.
Nauman, Harold Joseph, 4,072,063, Cl. 74-405.000.
Staebler, Paul J., 4,072,449, Cl. 418-87.000.
Young, D. Craig, 4,072,327, Cl. 285-137.00R.
Caywood, John Millard: *See*—
Bate, Robert T.; and Caywood, John Millard, 4,072,977, Cl. 357-24.000.
CBS Inc.: *See*—
Bauer, Benjamin B., 4,072,821, Cl. 179-1.0GQ.
Meshulam, Avram; and Rebold, Jerome I., 4,071,952, Cl. 30-151.000.
Sharp, Paul H., 4,072,079, Cl. 84-1.240.
Celanese Corporation: *See*—
Vanderspurt, Thomas H., 4,072,727, Cl. 260-638.00B.
Cenker, Moses: *See*—
Vogt, Herwart Curt; Parekh, Manher; Cenker, Moses; and Patton, John Thomas, Jr., 4,072,631, Cl. 252-431.00R.
Cernauskas, Larry V.; and Foss, Harry B., to Continental Group, Inc., The. Inside stripe by intermittent exterior spray guns. 4,072,127, Cl. 118-2.000.
Cesal, Jiri. Milling head. 4,072,083, Cl. 90-11.00A.
Ceskoslovenska akademie ved: *See*—
Hrabak, Frantisek; Bezdek, Milan; Hynkova, Vlasta; and Bouchal, Karel, 4,072,805, Cl. 526-43.000.
Chaix, Jean Edmond; Fajeau, Maurice; Le Borgne, Edmond; and Zerouki, Aime, to Commissariat a l'Energie Atomique. Immersion-tube heat exchanger. 4,072,189, Cl. 165-142.000.
Chambers, Alan F., to Nylite Skate Company of Canada Ltd. Method of making composite skate assembly. 4,071,938, Cl. 29-423.000.
Chambers, Derek, to Raytheon Company. Power supply. 4,073,003, Cl. 363-20.000.
Chambers, Derek; and Harley, A. Leonard, to Raytheon Company. Power supply with voltage protection circuit. 4,073,004, Cl. 363-79.000.
Chambers, Richard F.; and Granade, John J., to Olin Corporation. Anode seal assembly for electrolytic cells. 4,072,595, Cl. 204-219.000.
Champayne, Roy J. Portable abrading machine with dust collecting system. 4,071,981, Cl. 51-170.0MT.
Cheavin, Michael, to Balda-Werke Photographische Gerate und Kunststoff GmbH & Co. KG. Ranging system for camera viewfinder. 4,072,969, Cl. 354-166.000.
Cheng, Dah Yu, to International Power Technology, Inc. Pressure staged heat exchanger. 4,072,182, Cl. 165-1.000.
Cheng, Paul J., to Phillips Petroleum Company. Apparatus for the production of carbon black from coal. 4,072,468, Cl. 23-259.500.
Chernewski, Albert J., to House of Hints Corporation. Holding device. 4,071,976, Cl. 47-39.000.
Cherry, Isaac Raymond; and Anderson, Donald L., to Del Mar Avionics. Electrocardiographic computer. 4,073,011, Cl. 364-900.000.
Chess, William B., to Stauffer Chemical Company. Egg yolk extender. 4,072,764, Cl. 426-558.000.
Cheuvront, Robert M.: *See*—
Fletcher, C. Hugh; Bogdan, Raymond G.; Wright, Robert W.; and Cheuvront, Robert M., 4,072,103, Cl. 101-151.000.
Chevron Research Company: *See*—
Schneider, Ronald A., 4,072,647, Cl. 260-31.80R.
Chibata, Ichiro; Yamada, Shigeki; Yamamoto, Masao; and Sanematsu, Hisato, to Tanabe Seiyaku Co., Ltd. Process for the resolution of DL-6-chlorotryptophan. 4,072,691, Cl. 260-326.14T.
Chicago Pneumatic Tool Company: *See*—
Amtsberg, Lester A., 4,072,198, Cl. 173-10.000.
Chicago Switch, Inc.: *See*—
Spedale, Joseph J., 4,072,839, Cl. 200-295.000.
Chien, Chao C. Compressor. 4,072,210, Cl. 184-5.000.
Chikuda, Masahiro: *See*—
Murakado, Hiroshi; Nakata, Kazuhiro; Usui, Eiki; Tamiya, Tetsuo; Chikuda, Masahiro; Kitao, Yoshinobu; and Fujiwara, Akira, 4,072,542, Cl. 148-11.50A.
Chimie & Biologie: *See*—
Blum, Jean, 4,072,703, Cl. 260-455.00R.
Christen, Urs; and Guidinger, Dewayne C., to Varian Associates, Inc. Control system for a chromatography apparatus oven door. 4,072,846, Cl. 219-497.000.
Chu, Simon Long: *See*—
Golda, Eugene; Huang, Jen-chi; Shimazu, Ken-ichi; and Chu, Simon Long, 4,072,589, Cl. 204-129.400.
Chu, William Wing-Yen, to Bell Telephone Laboratories, Incorporated. MOS transistor driver circuits for plasma panels and similar matrix display devices. 4,072,937, Cl. 340-324.00M.
Chuss, John T.; Krechel, Henry H.; and Purvis, Joseph R., to Western Electric Co., Inc. Adhesively and magnetically holding an article. 4,071,944, Cl. 29-574.000.
Ciarniello, Giorgio: *See*—
Comastri, Mauro; and Ciarniello, Giorgio, 4,072,953, Cl. 343-713.000.
Comastri, Mauro; and Ciarniello, Giorgio, 4,072,954, Cl. 343-713.000.
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Ciba-Geigy Corporation: *See*—
Farooq, Saleem; Drabek, Jozef; Gsell, Laurenz; Karrer, Friedrich; and Meyer, Willy, 4,072,752, Cl. 424-304.000.
Fattinger, Volker, 4,072,736, Cl. 261-97.000.
Garner, Robert; Henshall, John Barry; and Petitpierre, Jean-Claude, 4,072,690, Cl. 260-326.14R.
Cipris, Divna; and Pouli, Dirk, to Allied Chemical Corporation. Electrochemical production of organic thiols. 4,072,584, Cl. 204-73.00R.
Cirino, Vidabelle O.; and Rowland, Stanley P., to United States of America, Agriculture. Fixation of multivalent metal salts of carboxyl-containing vinyl monomers on fibrous substrates. 4,072,784, Cl. 428-507.000.
Citta, Richard W., to Zenith Radio Corporation. Automatic phase and frequency control system. 4,072,909, Cl. 331-12.000.
Clampitt, Richard L., to Phillips Petroleum Company. Fire floor process. 4,072,191, Cl. 166-261.000.
Clark, George B.; and Lehnhoff, Terry F., to University of Missouri, The Curators of the. Thrust-impact rock-splitter. 4,072,353, Cl. 299-22.000.
Clarke-Gravely Corporation: *See*—
Block, Thomas S., 4,071,920, Cl. 15-49.00C.
Clary, John G., to Addmaster Corporation. Solenoid construction. 4,072,919, Cl. 335-257.000.
Claypoole, Stewart A.; and Wilhelm, Daniel C., to Corning Glass Works. Buffered optical waveguide fiber. 4,072,400, Cl. 350-96.300.
Clemens, John E. Harness racing hitch. 4,072,000, Cl. 54-2.000.
Clement, James C.: *See*—
Carroll, Luther E.; and Clement, James C., 4,072,360, Cl. 303-2.000.
Clifford Industries PTY., Ltd.: *See*—
Anderson, Warren Malcolm; and Shaffran, Clifford John, 4,072,121, Cl. 114-90.000.
Close, Ralph E.; and Oroshnik, William, to SCM Corporation. Dehydrophytol. 4,072,725, Cl. 260-632.00R.
Coal Industry (Patents) Limited: *See*—
Hartley, Dennis, 4,072,349, Cl. 299-1.000.
Coats & Clark Inc.: *See*—
Johnson, Joe, Jr., 4,072,367, Cl. 308-18.000.
Coe, Cyril Walter: *See*—
Barnaby, Bernard Sydney; Coe, Cyril Walter; Hall, Godfrey Stephen; and Leworthy, John Harwood, 4,072,224, Cl. 197-1.00R.
Cogley, Richard J., Jr., to Goodyear Tire & Rubber Company, The. Transparent pre-cure coating for rubbery polymers. 4,072,645, Cl. 260-29.70M.
Cohen, Nathan. Apparatus for removing snow from roadway. 4,071,966, Cl. 37-12.000.
Coho, Ralph W.; Kugle, John L.; and Futty, Robert C., to IRL Daffin

Associates, Inc. Method and apparatus for maintaining highways. 4,072,435, Cl. 404-110.000.
Colby, Richard A., to Sperry Rand Corporation. Tier counter means responsive to tier pattern storage cam position. 4,072,237, Cl. 214-6.00B.
Coldren, Arthur P.; Tither, Geoffrey; and Doane, Douglas V., to Amax Inc. Dual-phase hot-rolled steel strip. 4,072,543, Cl. 148-12.00F.
Cole, Robert Clay; Koch, Ronney R.; and Ramos, Joseph, to Halliburton Company. Pumpable epoxy resin composition. 4,072,194, Cl. 166-295.000.
Coley, James D.: *See*—
Burkhart, James G.; Burkhart, Montgomery P.; and Coley, James D., 4,072,381, Cl. 339-29.00R.
Coll, Antonio Luis Palomo. Process for preparing acid chlorides. 4,072,710, Cl. 260-544.00D.
Colorflo Limited: *See*—
Farrow, Harold Frederick, 4,072,102, Cl. 101-151.000.
Columbia Chemical Corporation: *See*—
Rosenberg, William E., 4,072,582, Cl. 204-54.00R.
Comastri, Mauro; and Ciarniello, Giorgio, to Societa Italiana Vetro Siv S.p.A. Multiband antenna for window panes. 4,072,953, Cl. 343-713.000.
Comastri, Mauro; and Ciarniello, Giorgio, to Societa Italiana Vetro Siv S.p.A. Multiband antenna for window panes. 4,072,954, Cl. 343-713.000.
Comastri, Mauro; and Ciarniello, Giorgio, to Societa Italiana Vetro Siv S.p.A. Multiband antenna for window panes. 4,072,955, Cl. 343-713.000.
Combs, Walter W.: *See*—
Loxley, Ted A.; Barber, Walter G.; Combs, Walter W.; and Webb, John M., 4,072,489, Cl. 65-18.000.
Cominco Ltd.: *See*—
Higgins, John Tyson, 4,072,024, Cl. 62-50.000.
Commander, Robert Duncan: *See*—
Case, William John Philip; and Commander, Robert Duncan, 4,072,990, Cl. 360-77.000.
Commissariat a l'Energie Atomique: *See*—
Chaix, Jean Edmond; Fajeau, Maurice; Le Borgne, Edmond; and Zerouki, Aime, 4,072,189, Cl. 165-142.000.
Communications Satellite Corporation: *See*—
Meulenberg, Andrew, Jr.; and Reynolds, John Harvey, 4,072,541, Cl. 136-89.0SJ.
Compagnie Francaise d'Etudes et de Construction - Technip: *See*—
Becdelievre, Charles; Kaiser, Victor; and Paradowski, Henri, 4,072,485, Cl. 62-23.000.
Comsonics, Inc.: *See*—
Shimp, Richard L., 4,072,899, Cl. 325-67.000.
Conant, Louis A.; Bolton, Wilbur Monroe; and Wilson, James Ellsworth, to Intertec Associates, Inc. Metal coated brittle containers, conduits and other objects for laboratory and industry. 4,072,243, Cl. 215-12.00R.
Concordia Development AB: *See*—
Kohli, Martti Ilmari; Eklund, Fjalar Ernst Erik; and Callerhorn, Bo Allan, 4,072,092, Cl. 99-389.000.
Condes Corporation: *See*—
Martin, Thomas R., 4,072,099, Cl. 101-44.000.
Conibear, Frank, to Woodstream Corporation. Frame and filament trigger for animal traps. 4,071,972, Cl. 43-92.000.
Conlin, Daniel. Sheet music page turning device. 4,072,080, Cl. 84-486.000.
Connell, David G., to Falk Corporation, The. Indexing coupling. 4,072,028, Cl. 64-24.000.
Continental Disc Corporation: *See*—
Hansen, Franklin A., 4,072,160, Cl. 137-68.00R.
Continental Group, Inc., The: *See*—
Cernauskas, Larry V.; and Foss, Harry B., 4,072,127, Cl. 118-2.000.
Control Data Corporation: *See*—
Parkin, Thomas Randall, 4,073,005, Cl. 364-200.000.
Conwed Corporation: *See*—
Akerson, David Wallace, 4,072,558, Cl. 162-145.000.
Cook, Franklin F. Unloading tailgate for self-unloading forage wagon. 4,072,242, Cl. 214-522.000.
Cooksey, James Judson; and Turner, Garland Linwood, to Allied Chemical Corporation. Spin pot with improved top cap. 4,072,457, Cl. 425-192.00S.
Coon, George M. Single stroke control system. 4,072,222, Cl. 192-131.00R.
Corfield, John Courtney, to Unimax Switch Limited. Electrical switches. 4,072,841, Cl. 200-332.000.
Corning Glass Works: *See*—
Claypoole, Stewart A.; and Wilhelm, Daniel C., 4,072,400, Cl. 350-96.300.
Illig, Edwin J., 4,072,490, Cl. 65-30.00R.
Love, Roy E., 4,072,399, Cl. 350-96.160.
Lynn, Merrill, 4,072,566, Cl. 195-63.000.
Cortese, Salvatore: *See*—
Fields, Cary Lynn; Fernandez, John Anthony; and Cortese, Salvatore, 4,071,919, Cl. 15-21.00R.
Costello, Edward Charles: *See*—
Simon, David Julian; and Costello, Edward Charles, 4,072,940, Cl. 340-347.0SY.
Costes, Jean-Raymond; Strini, Jean-Claude; and Hardouin, Serge, to Rhone-Progil. Process for the preparation of 1,2-dichloroethane in two reaction zones by reacting chlorine with not more than 102 mole percent of ethylene. 4,072,728, Cl. 260-660.000.
Couderc, Georges; Payen, Claude Andre; Dansac, Jean; and Symaniec, Leonidas, to Thomson-CSF. Optical tracking system. 4,072,861, Cl. 250-233.000.
Coviello, John W., to Westinghouse Electric Corporation. System for converting tonal images to line drawings. 4,072,818, Cl. 358-284.000.
Cox, John Patrick Anthony, to P.C. Cox (Mastic Appliances) Limited. Dispensing guns. 4,072,254, Cl. 222-391.000.
Coyle, John D., to Huston, Harold; and Beyerstedt, Ronald. Method of producing silicon containing cast iron. 4,072,511, Cl. 75-130.00R.
Coyne, Lawrence J.; George, Wilberdan V.; and Groner, Warren, to Technicon Instruments Corporation. Method and apparatus for optical discrimination of particles. 4,072,421, Cl. 356-39.000.
Craig, James R.; and Nerge, Steven F., to American Radiologic Systems, Inc. Automatic control system. 4,072,865, Cl. 250-409.000.
Craven, John Leslie, to Liquifry Company Limited. Electrical heater for heating liquid. 4,072,847, Cl. 219-523.000.
Creekmore, Mark D.; Vielhaber, Edward T.; and Carter, Russell P., Jr., to Goodyear Tire & Rubber Company, The. Extrudable compounded polyvinyl chloride. 4,072,790, Cl. 428-220.000.
Critchley Bros. Limited: *See*—
David, James Earle, 4,072,234, Cl. 211-41.000.
Crompton & Knowles Corporation: *See*—
Nelson, Alden W., 4,072,185, Cl. 165-30.000.
Croome, Ronald John; and Thomas, Donald Beuford, to P. Leiner & Sons Limited. Gelatin composition. 4,072,624, Cl. 252-301.350.
Crouch, Donald W.; and Kurtz, Donald R., to General Electric Company. High continuous current vacuum-type circuit interrupter. 4,072,837, Cl. 200-144.00B.
Crown American Irrigation, Inc.: *See*—
Batson, Paul E., 4,072,205, Cl. 180-66.00R.
Crown Controls Corporation: *See*—
Dammeyer, Ned E., 4,072,886, Cl. 318-602.000.
Cruson, Doyle D. Retractable unitary compact spare tire carrier assembly for underbody mounting to a pickup truck or the like. 4,072,258, Cl. 224-42.210.
Curtis, Gary Martin; and Wagner, David Prugh, to Illinois Tool Works Inc. Tension indicating washer unit. 4,072,081, Cl. 85-62.000.
Curtiss-Wright Corporation: *See*—
Loyd, Robert W., Jr., 4,072,448, Cl. 418-60.000.
Cusanelli, Dominic C.: *See*—
Rajcevic, Harold P.; Opie, William R.; and Cusanelli, Dominic C., 4,072,507, Cl. 75-74.000.
D. B. Enterprises, Inc.: *See*—
Sweet, Robert P.; and Stember, Daniel L., 4,071,926, Cl. 24-136.00R.
Dabal, Dennis Joseph; and Williams, Joseph James, to Hoffman-La Roche Inc. Novel dosage form. 4,072,551, Cl. 156-378.000.
Daebler, Donald H., to GTE Automatic Electric Laboratories Incorporated. Die set for forming axial leads of electrical component into hairpin lead pattern. 4,072,177, Cl. 140-105.000.
Daeuble, Manfred, to BASF Aktiengesellschaft. Dyeing polyester fibers. 4,072,465, Cl. 8-169.000.
Dagy, Victoria A.: *See*—
Lanham, James W.; Wilkinson, Ralph A.; and Dagy, Victoria A., 4,072,575, Cl. 195-103.50M.
Daicel Ltd.: *See*—
Tanaka, Kazunobu; Kusumoto, Masahiko; and Watanabe, Shoji, 4,071,975, Cl. 47-9.000.
Daigle, Phillip R., to Litton Business Systems, Inc. Removable keyboard switch. 4,072,840, Cl. 200-296.000.
Dajani, Esam Z.: *See*—
Adelstein, Gilbert W.; Dajani, Esam Z.; and Yen, Chung Hwai, 4,072,686, Cl. 260-293.690.
Daley, James Thomas: *See*—
Burant, Leonard Joseph; and Daley, James Thomas, 4,072,801, Cl. 429-110.000.
Daley, Luther O.: *See*—
Bullough, Vaughn L.; and Daley, Luther O., 4,072,599, Cl. 204-294.000.
Damgaard, Lavritz Gudmund, to Struers K/S. Electrolytic polishing apparatus. 4,072,598, Cl. 204-274.000.
D'Amico, John J.: *See*—
Bollinger, Frederic G.; and D'Amico, John J., 4,072,499, Cl. 71-94.000.
Dammeyer, Ned E., to Crown Controls Corporation. Apparatus for remote control of antenna rotators. 4,072,886, Cl. 318-602.000.
D'Angelo, Antonio Joseph; Mageli, Orville Leonard; and Sheppard, Chester Stephen, to Pennwalt Corporation. Coupled peroxides. 4,072,810, Cl. 526-230.000.
Daniel, William H. Aerator for bodies of water. 4,072,612, Cl. 210-169.000.
Dansac, Jean: *See*—
Couderc, Georges; Payen, Claude Andre; Dansac, Jean; and Symaniec, Leonidas, 4,072,861, Cl. 250-233.000.
Darragh, John Irvine, to Imperial Chemical Industries Limited. Manufacture of pyridine and methylpyridines. 4,072,684, Cl. 260-290.00P.
Daschievici, Stefan; and Ferat, Cezar, to Institutul de Cercetari si Proiectari Pentru Utilaje de Constructii de Drumuri(I.C.P.U.C.) Braila. Pressure system for driving the wheels of a vehicle. 4,072,009, Cl. 60-484.000.
Daum, Sol Jacob, to Sterling Drug Inc. Trans-4-(8-hydroxyoctyl)-5-octyl-1,3-dithiolane-2-thione. 4,072,692, Cl. 260-327.00M.
David, James Earle, to Critchley Bros. Limited. Location of card frame guide members. 4,072,234, Cl. 211-41.000.
Davidson, Charles Patrick Duncan: *See*—
Leighton, Peter Watson; and Davidson, Charles Patrick Duncan, 4,072,204, Cl. 180-34.000.

Davies, John W., III; Enters, Edward W.; and DuPas, Eugene A., to Gilson Brothers Company. Foldable handle. 4,071,922, Cl. 16-112.000.

Davis, Glenn A., to Scientific-Atlanta, Inc. Radio frequency alarm system including transmitting, coding and decoding circuitry. 4,072,931, Cl. 340-171.00R.

Davis, Peter Robert, to English Electric Valve Co., Ltd. Travelling wave tubes. 4,072,877, Cl. 315-3.500.

Davis, Steven S., to Envirotech Corporation. Belt dewrinkling and alignment method and apparatus. 4,072,611, Cl. 210-143.000.

Davis, William F., to Motorola, Inc. Comparison circuit having programmable hysteresis. 4,072,870, Cl. 307-350.000.

Dawson, Graham Robert; and Sansome, Dennis Hugh, to National Research Development Corporation. Method and apparatus for forming material by forcing through a die orifice. 4,072,034, Cl. 72-56.000.

de la Jonquiere, Pierre Jacques: *See—*
Wiart, Albert Charles; and de la Jonquiere, Pierre Jacques, 4,072,882, Cl. 318-227.000.

De La Moneda, Francisco H., to International Business Machines Corporation. Raised source and drain igfet device fabrication. 4,072,545, Cl. 148-187.000.

De La Moneda, Francisco H.; and Kotecha, Harish N., to International Business Machines Corporation. FET inverter with isolated substrate load. 4,072,868, Cl. 307-214.000.

Decker, John W.; and Tubbs, Myron W., to Eagle-Picher Industries, Inc. Three-piece heat resistant gasket. 4,072,316, Cl. 277-235.00B.

DeCola, Charles R.: *See—*
Polizzi, Charles J.; and DeCola, Charles R., 4,071,968, Cl. 40-473.000.

Del Mar Avionics: *See—*
Cherry, Isaac Raymond; and Anderson, Donald L., 4,073,011, Cl. 364-900.000.

Delalande S.A.: *See—*
Fauran, Claude P.; Turin, Michel J.; Imbert, Thierry F.; Raynaud, Guy M.; and Dorme, Nicole A. M., 4,072,682, Cl. 260-268.0BC.

Del Fabro, Marcello. Bending machine. 4,072,036, Cl. 72-217.000.

Demko, Paul S., to United States of America, Army. Microwave landing system antenna. 4,072,952, Cl. 343-700.0MS.

De Nora, Oronzio; Nidola, Antonio; and Spaziante, Placido M., to Diamond Shamrock Technologies S.A. Manganese dioxide electrodes. 4,072,586, Cl. 204-105.00M.

de Nora, Vittorio: *See—*
Bianchi, Giuseppe; de Nora, Vittorio; Gallone, Patrizio; and Nidola, Antonio, 4,072,585, Cl. 204-98.000.

Densen, Karl Thure. Tubular fence. 4,072,294, Cl. 256-24.000.

Denzel, Theodor; and Hoehn, Hans, to E. R. Squibb & Sons, Inc. 1,4- and 4,10-dihydro-4-oxo-pyrimido (1,2-A)-benzimidazole-3-carboxylic acids, esters and amides. 4,072,679, Cl. 260-256.40F.

Denzel, Theodor; and Hoehn, Hans, to E. R. Squibb & Sons, Inc. Derivatives of pyrazolo[1,5-a]pyrido[3,2-e]pyrimidine. 4,072,680, Cl. 260-256.40F.

Denzel, Theodor; and Hoehn, Hans, to E. R. Squibb & Sons, Inc. 3,7-Dihydro- and 1,7-dihydro-4H-pyrazolo[4',3':5,6]pyrido[4,3-d]pyrimidin-4-ones. 4,072,681, Cl. 260-256.40F.

Depew, Noel F.: *See—*
Towne, Gary L.; Depew, Noel F.; and Fowler, Charles A., 4,072,379, Cl. 339-17.0LM.

Det Norske Zinkkompani A/S: *See—*
Petterson, Stig Arvid; Lindstad, Tor; Dyvik, Froystein; and Steintveit, Georg, 4,072,503, Cl. 75-14.000.

Deuterium Corporation: *See—*
Spevack, Jerome S., 4,072,740, Cl. 423-563.000.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Diehl, Walter; and Koehler, Wolfgang, 4,072,593, Cl. 204-192.00F.
Pletka, Hans-Dieter; and Michel, Rudolf, 4,072,701, Cl. 260-448.80R.
Reinhardt, Helmut; Trebinger, Karl; and Kallrath, Gottfried, 4,072,796, Cl. 428-405.000.

Deutzmann, Klaus, to Goetzewerke Friedrich Goetze AG. Apparatus for distributing annular workpieces. 4,071,948, Cl. 29-809.000.

DeVicaris, Guy A. Artificial tree. 4,072,857, Cl. 362-123.000.

de Vries, Jan Willem. Conical mixing apparatus having support structure for the mixing screw provided below the bottom of the mixing vessel. 4,072,297, Cl. 366-287.000.

DeWinter, John Christian; Nahory, Robert Edward; and Pollack, Martin Alan, to Bell Telephone Laboratories, Incorporated. Growth of III-V layers containing arsenic, antimony and phosphorus. 4,072,544, Cl. 148-171.000.

Diamond International Corporation: *See—*
Radkowski, Stanley J.; Lawrence, John M.; Naggar, Enever; and Dunham, Raymond W., 4,072,473, Cl. 44-46.000.

Diamond Shamrock Technologies S.A.: *See—*
Bianchi, Giuseppe; de Nora, Vittorio; Gallone, Patrizio; and Nidola, Antonio, 4,072,585, Cl. 204-98.000.
De Nora, Oronzio; Nidola, Antonio; and Spaziante, Placido M., 4,072,586, Cl. 204-105.00M.

Didier Engineering GmbH: *See—*
Busbach, Willi, 4,072,239, Cl. 214-35.00R.

Diego Zamora S.A.: *See—*
Bermudez Munoz, Francisco, 4,072,235, Cl. 211-71.000.

Diehl, Walter; and Koehler, Wolfgang, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for production of a resistance element for resistance thermometers. 4,072,593, Cl. 204-192.00F.

Diem, Hans: *See—*
Halbritter, Guenter; Muehlthaler, Wolfgang; Sperber, Heinrich; Diem, Hans; Dudeck, Christian; and Lehmann, Gunter, 4,072,717, Cl. 260-603.00C.

Diepers, Heinrich, to Siemens Aktiengesellschaft. Method for the anodic polishing of surfaces of intermetallic niobium compounds and niobium alloys. 4,072,588, Cl. 204-129.430.

Diesel Kiki Co., Ltd.: *See—*
Kokubo, Toshihiro, 4,072,207, Cl. 180-108.000.

Dietzel, Walter; and Matusch, Siegfried, to Braunschweigische Maschinenbauanstalt. Drying drum for fluid materials. 4,071,961, Cl. 34-108.000.

Dietzel, Walter, to Braunschweigische Maschinenbauanstalt. Centrifuge, especially for the sugar industry. 4,072,266, Cl. 233-2.000.

Diggs, Richard E. Safety groove drill press and attachments. 4,072,439, Cl. 408-90.000.

Dingwall, Andrew Gordon Francis; and Rosenthal, Bruce David, to RCA Corporation. Voltage controlled oscillator having equally controlled current source and current sink. 4,072,910, Cl. 331-57.000.

Dixon, Leonard Fox: *See—*
Vellins, Cyril Eric; and Dixon, Leonard Fox, 4,072,462, Cl. 8-2.50A.

Doane, Douglas V.: *See—*
Coldren, Arthur P.; Tither, Geoffrey; and Doane, Douglas V., 4,072,543, Cl. 148-12.00F.

Dr. K. Witmer Elektronik AG: *See—*
Witmer, Kurt; and Cachin, Roland, 4,072,889, Cl. 323-9.000.

Donnelly Mirrors, Inc.: *See—*
Morgan, Cleon C., 4,072,340, Cl. 296-84.00R.

Doom, Lewis G. Motionless mixer. 4,072,296, Cl. 366-337.000.

Dorme, Nicole A. M.: *See—*
Fauran, Claude P.; Turin, Michel J.; Imbert, Thierry F.; Raynaud, Guy M.; and Dorme, Nicole A. M., 4,072,682, Cl. 260-268.0BC.

Dorsch, Norman: *See—*
Louis, Eckhart; Dorsch, Norman; and Wohlfarth, Ernst, 4,072,655, Cl. 260-46.50G.

Dougherty, Lemuel A.: *See—*
Smitherman, Stephen N.; and Dougherty, Lemuel A., 4,072,094, Cl. 100-3.000.

Douglas, Walter M., to UOP Inc. Metal phthalocyanine catalyst preparation. 4,072,630, Cl. 252-430.000.

Dove, Michael David, to Wainco Products Limited. Apparatus for transporting an elongate piece of material. 4,072,260, Cl. 226-173.000.

Dow Badische Company: *See—*
Jahn, Alex K., 4,072,617, Cl. 252-8.900.

Dow Chemical Company, The: *See—*
Hoornstra, Clayton W.; and Stevens, Violete L., 4,072,529, Cl. 96-115.00R.
Lao, Binneg Yanbing, 4,072,046, Cl. 73-574.000.
Weiss, Stefan Adam; Torney, Harry Lester; and Caldwell, William Joseph, 4,072,565, Cl. 195-1.100.
Williams, Dennis A.; and Carswell, Robert, 4,072,619, Cl. 252-47.500.

Doyle, Dewey I., Jr., to Doyle Vacuum Cleaner Company. Vacuum cleaners. 4,072,483, Cl. 55-372.000.

Doyle Vacuum Cleaner Company: *See—*
Doyle, Dewey I., Jr., 4,072,483, Cl. 55-372.000.

Drabek, Jozef: *See—*
Farooq, Saleem; Drabek, Jozef; Gsell, Laurenz; Karrer, Friedrich; and Meyer, Willy, 4,072,752, Cl. 424-304.000.

Drews, William A.; Padgett, Charles L.; and Pinna, Ray Anthony, to United States of America, Army. Light weight radar reflector. 4,072,948, Cl. 343-18.00C.

Drossel, Rolf: *See—*
Neidl, Herbert; Kaspar, Gunther; and Drossel, Rolf, 4,072,559, Cl. 176-19.0LD.

D'Silva, Themistocles D. J., to Union Carbide Corporation. 1,3,5-Trithiane and 1,3,5-oxadithiane carbamoyloxime compounds and insecticidal and miticidal compositions and methods employing them. 4,072,750, Cl. 424-276.000.

D'Silva, Themistocles Damasceno Joaquim, to Union Carbide Corporation. Pesticidal N-substituted bis-carbamoyl sulfide compounds. 4,072,751, Cl. 424-298.000.

DuBose, Jesse K.: *See—*
Naizer, Kenneth C.; and DuBose, Jesse K., 4,072,043, Cl. 73-23.000.

Ducon Company, Inc., The: *See—*
Zenz, Frederick A., 4,072,130, Cl. 122-4.00D.

Dudeck, Christian: *See—*
Halbritter, Guenter; Muehlthaler, Wolfgang; Sperber, Heinrich; Diem, Hans; Dudeck, Christian; and Lehmann, Gunter, 4,072,717, Cl. 260-603.00C.

Dudley, Leslie Peter. Stereoscopic projection microscopy. 4,072,967, Cl. 354-79.000.

Due, George B.; and Guarino, John P., to Mobil Oil Corporation. Radiation curable coating. 4,072,592, Cl. 204-159.150.

Dugois, Jean-Pierre: *See—*
Morel, Paul; and Dugois, Jean-Pierre, 4,072,597, Cl. 204-243.00M.

Dumont, Claude: *See—*
Nedelec, Lucien; Guillaume, Jacques; and Dumont, Claude, 4,072,685, Cl. 260-293.810.

Dunham, Raymond W.: *See—*
Radkowski, Stanley J.; Lawrence, John M.; Naggar, Enever; and Dunham, Raymond W., 4,072,473, Cl. 44-46.000.

Dunn, David M., to Marquette Electronics, Inc. Anti-snag device for electrode lead clips. 4,072,388, Cl. 339-103.00R.

DuPas, Eugene A.: *See—*
Davies, John W., III; Enters, Edward W.; and DuPas, Eugene A., 4,071,922, Cl. 16-112.000.

Du Pont de Nemours, E. I., and Company: *See—*
Bratt, Martin Daniel, 4,072,528, Cl. 96-87.00R.
Fan, Roxy, 4,072,527, Cl. 96-87.00R.
Knox, Kenneth Leith; and Lees, Joseph Kolb, 4,072,779, Cl. 428-220.000.
Niederhauser, Donald Olcott, 4,071,931, Cl. 28-101.000.

Du Quesne, Francis. Device used for detaching the beads of a tire from the wheel rim. 4,072,178, Cl. 157-1.170.

Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, to Smith Kline & French Laboratories Limited. Certain guanidine compounds, and their use as inhibitors of histamine activity. 4,072,748, Cl. 424-270.000.

Dursch, Walter: *See—*
Linke, Fritz; Dursch, Walter; and Kleiner, Hans-Jerg, 4,072,776, Cl. 427-390.00D.

Durst, Karlheinz: *See—*
Kramer, Karl; and Durst, Karlheinz, 4,072,233, Cl. 206-634.000.

Dyvik, Froystein: *See—*
Petterson, Stig Arvid; Lindstad, Tor; Dyvik, Froystein; and Steintveit, Georg, 4,072,503, Cl. 75-14.000.

E. R. Squibb & Sons, Inc.: *See—*
Denzel, Theodor; and Hoehn, Hans, 4,072,679, Cl. 260-256.40F.
Denzel, Theodor; and Hoehn, Hans, 4,072,680, Cl. 260-256.40F.
Denzel, Theodor; and Hoehn, Hans, 4,072,681, Cl. 260-256.40F.

Eagle-Picher Industries, Inc.: *See—*
Decker, John W.; and Tubbs, Myron W., 4,072,316, Cl. 277-235.00B.

Eastman Kodak Company: *See—*
Ardemagni, Loyce A., 4,072,735, Cl. 260-897.00A.
Frank, Lee Fitzpatrick; and Kaukeinen, Joseph Yorks, 4,072,411, Cl. 353-121.000.
Lidel, Darrel D., 4,072,769, Cl. 117-93.10R.
Masurekar, Prakash S.; and Goodhue, Charles T., 4,072,568, Cl. 195-65.000.
McConnell, Richard L.; Weemes, Doyle A.; and Joyner, Frederick B., 4,072,812, Cl. 526-348.200.
McConnell, Richard L.; Weemes, Doyle A.; and Joyner, Frederick B., 4,072,813, Cl. 526-348.200.

Eaton Corporation: *See—*
Larson, Gerald L.; Pi, Alberto; and Uitvlugt, Martin W., 4,072,206, Cl. 180-105.00E.
O'Neil, Walter K., 4,072,927, Cl. 340-58.000.

Ebnother, Anton; Bastian, Jean-Michel; Gadient, Fulvio; and Stoll, Andre, to Sandoz Ltd. Tricyclo piperidino ketones and soporific compositions thereof. 4,072,756, Cl. 424-267.000.

Eckerdt, George H. Key holder. 4,072,033, Cl. 70-456.00B.

Ecolaire Incorporated: *See—*
Walters, Thomas, Jr., 4,072,253, Cl. 222-368.000.

Eder, Ulrich: *See—*
Sauer, Gerhard; Hauser, Helmut; Haffer, Gregor; Ruppert, Juergen; Eder, Ulrich; and Wiechert, Rudolf, 4,072,716, Cl. 260-586.00F.

Edwards, John A.: *See—*
Beard, Colin C.; Edwards, John A.; and Fried, John H., 4,072,696, Cl. 260-397.600.

Ehara, Takuhisa: *See—*
Teshima, Toru; Ehara, Takuhisa; and Nakanishi, Kaname, 4,072,005, Cl. 58-42.500.

Ehrentraut, Otto, to Miba Gleitlager Aktiengesellschaft. Sliding-surface bearing and process of manufacturing the same. 4,072,368, Cl. 308-3.00R.

Eibeck, Richard E.: *See—*
Berenbaum, Morris B.; Evans, Francis E.; Eibeck, Richard E.; and Robinson, Martin A., 4,072,027, Cl. 62-112.000.

Eibeck, Richard Elmer: *See—*
Nychka, Henry Robert; Eibeck, Richard Elmer; Robinson, Martin Alvin; and Jones, Edward Stephen, 4,072,726, Cl. 260-633.000.

Eibofner, Eugen, to Kaltenbach & Voigt. Turbine insert for the head of a dental turbine elbow. 4,071,954, Cl. 32-27.000.

Eickenscheidt, Wennemar: *See—*
Ludwig, Martin; and Eickenscheidt, Wennemar, 4,072,819, Cl. 178-17.500.

Eigenmann, Ludwig. Retro-reflecting assembly. 4,072,403, Cl. 350-105.000.

Eikenberg, Dieter: *See—*
Burgdorf, Jochen; Eikenberg, Dieter; Stoka, Roberto; and Marianu, Vlod, 4,072,215, Cl. 188-72.400.

Eimen, Shawn H.: *See—*
Swenson, Richard F.; Eimen, Shawn H.; and Gryga, John J., Jr., 4,072,287, Cl. 248-399.000.

Einbinder, Seymour K.: *See—*
Saxe, Frederick E.; and Einbinder, Seymour K., 4,072,107, Cl. 102-4.000.

Eisner, Albert M.: *See—*
Burke, Courtney L., 4,072,835, Cl. 200-61.470.

Ekenstam, Bo Thuresson Af; and Nordqvist, Erik Gustaf Percy, to Landstingens Inkopscentral. Container suitable for smaller quantities of fluid or semifluid substances. 4,072,249, Cl. 222-95.000.

Eklund, Fjalar Ernst Erik: *See—*
Kohli, Martti Ilmari; Eklund, Fjalar Ernst Erik; and Callerhorn, Bo Allan, 4,072,092, Cl. 99-389.000.

Elgar, Everett Charles: *See—*
Boothman, David Richard; Rehder, Robert Henry; and Elgar, Everett Charles, 4,072,997, Cl. 361-103.000.

Eligehausen, Hans, to W. C. Heraeus GmbH. Daylight-simulating incandescent lamp light fixture, particularly for medical and dental use. 4,072,856, Cl. 362-2.000.

Elkem-Spigerverket A/S: *See—*
Pedersen, Thor; and Kristiansen, Aksel Erik, 4,072,250, Cl. 222-326.000.

Elliott, David Robert, to Hepworth Plastics Limited. Pipe couplings. 4,072,328, Cl. 285-169.000.

Elliott, Raymond: *See—*
Buckingham, Herbert Charles; and Elliott, Raymond, 4,072,845, Cl. 219-146.300.

Elliott, Stanley B. Visual-type temperature-responsive device. 4,072,055, Cl. 73-356.000.

Elmqvist, Rune, to Siemens Aktiengesellschaft. Recorder operating with drops of liquid. 4,072,959, Cl. 346-140.00R.

Emark, Lawrence W., Jr., to Westinghouse Electric Corporation. Control system and method for removal of coke from a coke oven. 4,072,885, Cl. 318-600.000.

Emelyanenko, July Georgievich: *See—*
Zorev, Nikolai Nikolaevich; Astafiev, Anatoly Alexandrovich; Loboda, Alexandr Sergeevich; Savukov, Vladimir Pavlovich; Runov, Andrei Efimovich; Belov, Vladimir Alexandrovich; Sobolev, Jury Vasilievich; Sobolev, Valentin Vasilievich; Pavlov, Nikolai Mikhailovich; Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Balandin, Jury Fedorovich; Gorynin, Igor Vasilievich; Zvezdin, Jury Ivanovich; Ivanov, Kuzma Makeevich; Ignatov, Viktor Alexandrovich; and Emelyanenko, July Georgievich, 4,072,509, Cl. 75-124.000.

EMI Limited: *See—*
Webley, Reginald Sidney, 4,072,875, Cl. 313-60.000.

Emmett, John Colin: *See—*
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,072,748, Cl. 424-270.000.

Emmons, Stephen P.: *See—*
Buss, Dennis Darcy; Emmons, Stephen P.; and Barton, James Brockman, 4,072,978, Cl. 357-24.000.

Endo, Seiji: *See—*
Konomi, Tuyoshi; Endo, Seiji; Yamaguchi, Masayasu; and Katsuo, Kenichi, 4,072,664, Cl. 260-78.00R.

Energy Absorption Systems, Inc.: *See—*
Seegmiller, Wan; Young, Bruce O.; and Story, Joe A., 4,072,334, Cl. 293-71.00R.

Energy Development Associates: *See—*
Symons, Philip C.; and Amato, Carmelo J., 4,072,540, Cl. 429-70.000.

Engel, Joseph C.; and Saletta, Gary F., to Westinghouse Electric Corporation. Starting and operating apparatus for high pressure sodium lamp ballasts. 4,072,878, Cl. 315-205.000.

England, Alan Gordon: *See—*
Gow, James Gordon; and England, Alan Gordon, 4,072,610, Cl. 210-90.000.

English Electric Valve Co., Ltd.: *See—*
Davis, Peter Robert, 4,072,877, Cl. 315-3.500.
Jones, Eric, 4,072,467, Cl. 23-254.00E.

Entek Corporation: *See—*
Adams, Ladd M., 4,072,291, Cl. 251-181.000.

Enters, Edward W.: *See—*
Davies, John W., III; Enters, Edward W.; and DuPas, Eugene A., 4,071,922, Cl. 16-112.000.

Envirotech Corporation: *See—*
Davis, Steven S., 4,072,611, Cl. 210-143.000.

Eppendorf Geratebau Netheler & Hinz GmbH: *See—*
Brysch, Gottfried, 4,072,330, Cl. 285-239.000.

Epsilon Lambda Electronics Corporation: *See—*
Knox, Robert M.; and Toulios, Peter P., 4,072,902, Cl. 325-446.000.

ERG Industrial Corporation Limited: *See—*
Godfrey, Nelson Frederick John, 4,072,834, Cl. 200-16.00C.

ESB Incorporated: *See—*
Leeson, Jeffrey S.; and Szabo, Joseph F., 4,072,799, Cl. 429-82.000.

Etablissements Genoud & Cie: *See—*
Neyret, Guy, 4,072,290, Cl. 251-127.000.

Ethyl Corporation: *See—*
Hargis, Duane C.; and Kehoe, Lawrence J., 4,072,732, Cl. 260-682.000.
Hargis, Duane C.; and Kehoe, Lawrence J., 4,072,733, Cl. 260-682.000.

Eue, Ludwig: *See—*
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,072,500, Cl. 71-98.000.

Eurolando: *See—*
Laune, Pierre, 4,072,318, Cl. 280-42.000.

Evans, Francis E.: *See—*
Berenbaum, Morris B.; Evans, Francis E.; Eibeck, Richard E.; and Robinson, Martin A., 4,072,027, Cl. 62-112.000.

Ewald, Jerome T., to Bendix Corporation, The. Hydraulic brake booster. 4,072,011, Cl. 60-555.000.

Ewing, William D., to Foxon Packaging Corporation. Ultraviolet blister sealing means. 4,072,552, Cl. 156-380.000.

Ex-Cell-O Corporation: *See—*
Bosche, Eugene R., 4,072,089, Cl. 93-44.1GT.

Exxon Research & Engineering Co.: *See—*
O'Farrell, Charles P.; and Higgins, John J., 4,072,648, Cl. 260-33.4PQ.

Schlosberg, Richard H.; Wright, Franklin J.; and Hartgerink, Ronald L., 4,072,475, Cl. 48-210.000.
Ezaki, Norio. Cake cutter. 4,072,075, Cl. 83-153.000.
Fabbrica Italiana Magneti Marelli S.p.A.: *See*—
Huwyler, Franco, 4,072,893, Cl. 324-208.000.
Fabrique Nationale Herstal S.A.: *See*—
Kaiser, Georges J., 4,072,444, Cl. 417-269.000.
Fahn, Rudolf; Brenner, Bernd; and Buckl, Hans, to Sud-Chemie AG. Process for the two-stage decomposition of hemi-celluloses to xylose. 4,072,538, Cl. 127-37.000.
Fajeau, Maurice: *See*—
Chaix, Jean Edmond; Fajeau, Maurice; Le Borgne, Edmond; and Zerouki, Aime, 4,072,189, Cl. 165-142.000.
Falk Corporation, The: *See*—
Connell, David G., 4,072,028, Cl. 64-24.000.
Phinney, John M., 4,072,221, Cl. 192-.098.
Fan, Roxy, to Du Pont de Nemours, E. I., and Company. Oxygen barrier layers for photopolymerizable elements. 4,072,527, Cl. 96-87.00R.
Farha, Floyd, Jr.; and Box, E. O., Jr., to Phillips Petroleum Company. Polluted water purification. 4,072,608, Cl. 210-63.00R.
Farmer, Melville E. Wall construction member. 4,071,995, Cl. 52-729.000.
Farooq, Saleem; Drabek, Jozef; Gsell, Laurenz; Karrer, Friedrich; and Meyer, Willy, to Ciba-Geigy Corporation. Pesticidal benzaspiro carboxylates. 4,072,752, Cl. 424-304.000.
Farrow, Harold Frederick, to Colorflo Limited. Fluid applying plate. 4,072,102, Cl. 101-151.000.
Farwell, Allen C.; Farwell, Dale E.; and Farwell, Duane C. Liquid level controller and soil test instrument. 4,072,044, Cl. 73-38.000.
Farwell, Dale E.: *See*—
Farwell, Allen C.; Farwell, Dale E.; and Farwell, Duane C., 4,072,044, Cl. 73-38.000.
Farwell, Duane C.: *See*—
Farwell, Allen C.; Farwell, Dale E.; and Farwell, Duane C., 4,072,044, Cl. 73-38.000.
Fattinger, Volker, to Ciba-Geigy Corporation. Packing material. 4,072,736, Cl. 261-97.000.
Fauran, Claude P.; Turin, Michel J.; Imbert, Thierry F.; Raynaud, Guy M.; and Dorme, Nicole A. M., to Delalande S.A. New 1-(2'-aroyl eth-1' yl) 2-(4''-acetamido piperazine-1'' yl methyl) benzimidazoles, their therapeutical applications and method for their preparation. 4,072,682, Cl. 260-268.0BC.
Feichtinger, Hans; Lutze, Siegfried; Birnkraut, Hans-Walter; and Kluy, Werner, to Ruhrchemie AG. 4,4'-Thio-bis-(dialkylphenol)/formaldehyde condensates and process for producing them. 4,072,659, Cl. 260-57.00A.
Ferag AG: *See*—
Honegger, Werner; and Muller, Erwin, 4,072,228, Cl. 198-459.000.
Ferat, Cezar: *See*—
Daschievici, Stefan; and Ferat, Cezar, 4,072,009, Cl. 60-484.000.
Ferguson, Richard; and Troutman, Kenneth W., to Terrell Machine Company, The. Textile bobbin hoist. 4,072,240, Cl. 214-313.000.
Fernandez, John Anthony: *See*—
Fields, Cary Lynn; Fernandez, John Anthony; and Cortese, Salvatore, 4,071,919, Cl. 15-21.00R.
Ferse, Armin; and Grimm, Harald, to Akademie der Wissenschaften der Deutschen Demokratischen Republik. Process for conversion of oligomers and higher polymers by irradiation with high-energy electrons. 4,072,591, Cl. 204-159.200.
Fiber Materials, Inc.: *See*—
Pepper, Roger T.; and Zack, Thomas A., 4,072,516, Cl. 75-229.000.
Fields, Cary Lynn; Fernandez, John Anthony; and Cortese, Salvatore. Waste chute cleaning apparatus. 4,071,919, Cl. 15-21.00R.
Fillios, Jean-Pierre; and Kergueno, Joseph, to Multifluid-Energie, Societe Anonyme. Prefabricated ventilating panel including heat transfer means. 4,072,141, Cl. 126-270.000.
Finn, Arthur Francis, to United States of America, Navy. Remote access washer with bolt alignment tool. 4,072,070, Cl. 81-71.000.
Finney, Donald C., to A. F. Industries, Inc. Amine salt composition useful in inhibiting metal corrosion. 4,072,626, Cl. 252-389.00A.
Firestone Tire & Rubber Company, The: *See*—
Lawson, David Francis, 4,072,651, Cl. 260-42.440.
Ridha, Raouf Abdul, 4,072,358, Cl. 301-63.0PW.
Fischer, Hannes: *See*—
Ritz, Jurgen; Zimmermann, Rolf; and Fischer, Hannes, 4,072,642, Cl. 260-22.0CB.
Fischer, Peter: *See*—
Meisert, Ernst; and Fischer, Peter, 4,072,712, Cl. 260-566.00R.
Fisons Limited: *See*—
Gates, Peter Stuart; Gillon, John; and Saggers, David Thomas, 4,072,495, Cl. 71-76.000.
Flaschar, Heinz: *See*—
Heiser, Joachim; Hoheisel, Rainer; Flaschar, Heinz; Gand, Heinz; Kleinschmidt, Heinz; Braunlinger, Konrad; Sopha, Klaus; Schempp, Roland; and Sanzenbacher, Hermann, 4,072,169, Cl. 137-596.130.
Fleming, James H.: *See*—
Cady, Paxton; Omura, Takeshi; Rudin, Melvin; and Fleming, James H., 4,072,578, Cl. 195-127.000.
Fletcher, C. Hugh; Bogdan, Raymond G.; Wright, Robert W.; and Cheuvront, Robert M., to Vandersons Corporation. Gravure press for making multicolor proofs. 4,072,103, Cl. 101-151.000.
FMC Corporation: *See*—
Taylor, John S.; and Grantham, William G., 4,072,785, Cl. 428-536.000.
Focke, Heinz, to Focke & Pfuhl. Pack and blank for making the pack and web of packing material for making the blanks. 4,072,263, Cl. 229-37.00R.
Focke & Pfuhl: *See*—
Focke, Heinz, 4,072,263, Cl. 229-37.00R.
Fokker-VFW B.V.: *See*—
Bijlmer, Paul Frederik Adriaan, 4,072,896, Cl. 324-61.00P.
Folk, Craig L., to United States of America, Agriculture. Apparatus for forming textile lap. 4,071,925, Cl. 19-296.000.
Folsom, L. R.: *See*—
Bates, P. A.; Folsom, L. R.; and Haberstroh, A. J., 4,072,082, Cl. 89-162.000.
Foncannon, William S. Garbage can support. 4,072,286, Cl. 248-154.000.
Ford Aerospace & Communications Corporation: *See*—
McConnell, William W., 4,072,615, Cl. 210-282.000.
Ford Motor Company: *See*—
Barton, David W., 4,072,186, Cl. 165-43.000.
Forges de Gueugnon: *See*—
Boivin, Pierre Andre, 4,073,007, Cl. 364-508.000.
Fosroc International Limited: *See*—
Pearson, Leonard Louis, 4,072,019, Cl. 61-36.00C.
Foss, Harry B.: *See*—
Cernauskas, Larry V.; and Foss, Harry B., 4,072,127, Cl. 118-2.000.
Foster Wheeler Energy Corporation: *See*—
Romanowski, Chester J., 4,072,276, Cl. 241-117.000.
Foucht, Millard E.: *See*—
Hayden, David E.; and Foucht, Millard E., 4,072,623, Cl. 252-182.000.
Fowler, Charles A.: *See*—
Towne, Gary L.; Depew, Noel F.; and Fowler, Charles A., 4,072,379, Cl. 339-17.0LM.
Fox, Roy W., to Fox, Roy W. Electrical connector. 4,072,390, Cl. 339-176.0MF.
Foxon Packaging Corporation: *See*—
Ewing, William D., 4,072,552, Cl. 156-380.000.
Fraas, Arthur P., to United States of America, Energy. Heat exchanger with intermediate evaporating and condensing fluid. 4,072,185, Cl. 165-11.000.
Frank, Lee Fitzpatrick; and Kaukeinen, Joseph Yorks, to Eastman Kodak Company. Display device having image sense reversal capability. 4,072,411, Cl. 353-121.000.
Frankel, Jacob, administrator: *See*—
Ravey, Mani; Shorr, Leonard Marshall; and Waterman, Jacques A., deceased, 4,072,806, Cl. 526-89.000.
Franz, Helmut, to PPG Industries, Inc. Linear curtain spray applicator. 4,072,772, Cl. 427-164.000.
Fraser, David Bruce; and Kammlott, Guenther Wilhelm, to Bell Telephone Laboratories, Incorporated. Method for making patterned gold metallization. 4,072,768, Cl. 427-34.000.
Frear, David L.: *See*—
Waldron, Clifford R.; Yonkers, Karl W.; Goebeler, Robert; Frear, David L.; and Bright, Edward J., 4,072,394, Cl. 339-276.00T.
Fredenberg, James D.: *See*—
Wilson, Edward A.; and Fredenberg, James D., 4,072,188, Cl. 165-80.000.
Frederick, Warren Phillip, to Baxter Travenol Laboratories, Inc. Liquid applying device. 4,072,128, Cl. 118-3.000.
Freehauf, Eugene G., to Zero Corporation. Dual inline integrated circuit socket. 4,072,380, Cl. 339-17.0CF.
Freitag, Herbert: *See*—
Wirges, Winfried; and Freitag, Herbert, 4,072,288, Cl. 248-404.000.
French, Douglas M.: *See*—
Hellman, Robert R.; and French, Douglas M., 4,072,898, Cl. 325-37.000.
Fried, John H.: *See*—
Beard, Colin C.; Edwards, John A.; and Fried, John H., 4,072,696, Cl. 260-397.600.
Friedrich, Adolf: *See*—
Walther, Herbert; Hartig, Wolfgang; Friedrich, Adolf; and Raue, Roderich, 4,072,911, Cl. 331-94.50L.
Friedrich, Hans-Jurgen, to Interatom, Internationale Atomreaktorbau GmbH. Bottom cooler for nuclear reactors. 4,072,561, Cl. 176-38.000.
Friend, Lindsay Carlton, to Ingersoll-Rand Company. Automatic wire handling and wrapping apparatus. 4,072,176, Cl. 140-93.00R.
Fuchs, Dietrich; and Luttner, Albin, to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft. Axle suspension systems for a vehicle. 4,072,322, Cl. 280-713.000.
Fuchs, Francis Joseph, Jr., to Western Electric Co., Inc. Apparatus and methods for forming a plurality of elongated members. 4,072,037, Cl. 72-261.000.
Fuji Chemical Industries Company: *See*—
Hirame, Yasutel; and Nakamura, Youichi, 4,072,530, Cl. 106-44.000.
Fuji Electric Co., Ltd.: *See*—
Yasuhara, Takeshi; Tamai, Mitsuru; and Yuhara, Tadanori, 4,072,057, Cl. 73-718.000.
Fuji Photo Film Co., Ltd.: *See*—
Inouye, Kozo; Yokota, Yukio; and Nakazyo, Kiyoshi, 4,072,525, Cl. 96-55.000.
Kondo, Toshihiro, 4,072,965, Cl. 354-51.000.
Kuboshima, Makoto, 4,072,971, Cl. 354-201.000.
Shirahata, Ryuji; Suzuki, Masaaki; and Kitamoto, Tatsuji, 4,072,781, Cl. 428-336.000.
Yamaguchi, Teruo; and Sera, Hidefumi, 4,072,639, Cl. 260-6.000.
Fuji Photo Optical Co., Ltd.: *See*—
Asano, Seiji, 4,072,966, Cl. 354-60.00R.

Fujiki, Norio: *See—*
Katsumata, Masaaki; and Fujiki, Norio, 4,072,945, Cl. 343-7.0VM.
Fujiwara, Akira: *See—*
Murakado, Hiroshi; Nakata, Kazuhiro; Usui, Eiki; Tamiya, Tetsuo; Chikuda, Masahiro; Kitao, Yoshinobu; and Fujiwara, Akira, 4,072,542, Cl. 148-11.50A.
Fujizuka, Kaoru, to Rank Xerox Ltd. Device for preventing movement of an original document on a reciprocating copier platen. 4,072,418, Cl. 355-75.000.
Fukumoto, Mitsunobu: *See—*
Watanabe, Itaru; Yamakoshi, Yasumichi; Miyauchi, Hirotsugu; Tsushima, Sakae; and Fukumoto, Mitsunobu, 4,072,793, Cl. 428-255.000.
Fukuoka, Sadao. Ventilated footwear. 4,071,963, Cl. 36-3.00B.
Fukushima, Osamu, to Kuraray Co., Ltd. Porous sheet material and its production. 4,072,773, Cl. 427-246.000.
Fulker, John Leslie; Hall, David John; and Lock, Robert Christopher, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Supercritical aerofoils. 4,072,282, Cl. 244-35.00R.
Funabiki, Kyohei; and Tokunaga, Tetsuya, to Sumitomo Durez Company, Ltd. Plugging compositions for blast furnace tap holes. 4,072,531, Cl. 106-56.000.
Fung, Cheung King: *See—*
Pun, Kwok-Wah, 4,072,933, Cl. 340-229.000.
Futty, Robert C.: *See—*
Coho, Ralph W.; Kugle, John L.; and Futty, Robert C., 4,072,435, Cl. 404-110.000.
G. D. Searle & Co.: *See—*
Adelstein, Gilbert W.; Dajani, Esam Z.; and Yen, Chung Hwai, 4,072,686, Cl. 260-293.690.
Gachot, Jean; and Lekarski, Simeon. Pneumatic timing device. 4,072,172, Cl. 137-624.200.
Gadient, Fulvio: *See—*
Ebnother, Anton; Bastian, Jean-Michel; Gadient, Fulvio; and Stoll, Andre, 4,072,756, Cl. 424-267.000.
Gallagher, John F. Fireplace heat loss shield. 4,072,140, Cl. 126-140.000.
Gallone, Patrizio: *See—*
Bianchi, Giuseppe; de Nora, Vittorio; Gallone, Patrizio; and Nidola, Antonio, 4,072,585, Cl. 204-98.000.
Gambell, James W.: *See—*
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Gammer, Peter, to Otto Bock Orthopadische Industrie K.G. Electric storage battery arrangement for use in electrically driven prosthetic devices. 4,072,800, Cl. 429-97.000.
Gand, Heinz: *See—*
Heiser, Joachim; Hoheisel, Rainer; Flaschar, Heinz; Gand, Heinz; Kleinschmidt, Heinz; Braunlinger, Konrad; Sopha, Klaus; Schempp, Roland; and Sanzenbacher, Hermann, 4,072,169, Cl. 137-596.130.
Ganellin, Charon Robin: *See—*
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,072,748, Cl. 424-270.000.
Garcia Corporation, The: *See—*
Vaudaux, Francis, 4,072,321, Cl. 280-637.000.
Garcia, Joe La; Griffing, Brandt Mead; Hu, Paul Yu-Fei; and Millington, Richard George, to International Business Machines Corporation. Linear actuator printer carriage. 4,072,101, Cl. 101-93.150.
Gardner, Delbert J., to Bendix Corporation, The. Control means for a two stage servomotor. 4,072,014, Cl. 60-575.000.
Garland Smith Engineering Co., Inc.: *See—*
Smith, Garland Y.; Scott, Gerald R.; Blazek, George A.; and Kowalski, John L., 4,072,437, Cl. 407-118.000.
Garlinghouse, Leslie H. Machine for controlled conditioning of liquids and mixture. 4,072,030, Cl. 68-23.00R.
Garmong, Victor H., to Wolfe, George Edwin. Computer controlled bulk storage fluid dispensing terminal. 4,072,929, Cl. 340-147.00A.
Garner, Robert; Henshall, John Barry; and Petitpierre, Jean-Claude, to Ciba-Geigy Corporation. Indolyl methylene leuco dyestuffs. 4,072,690, Cl. 260-326.14R.
Gartner, Klaus: *See—*
Phillips, Peter J., 4,072,032, Cl. 70-339.000.
Gaspar, Peter. Alternating piston rotary apparatus. 4,072,447, Cl. 418-36.000.
Gass, Hans; Hintermann, Hans Erich; and Griepentrog, Hartmut, to Laboratoire Suisse de Recherches Horlogeres; and Gutehoffnungshutte Sterkrade Aktiengesellschaft. Diffusion barrier and separation substance for metal parts adjoining each other in an oxygen free atmosphere. 4,072,797, Cl. 428-409.000.
Gates, Peter Stuart; Gillon, John; and Saggers, David Thomas, to Fisons Limited. 5-Benzofuranyl esters as herbicides and plant growth regulants. 4,072,495, Cl. 71-76.000.
Gau, Georg, to Kronseder, Hermann. Label extracting and transferring device. 4,072,555, Cl. 156-571.000.
Gaylord, Edson C., to Gaylord Industries, Inc. Double inlet kitchen ventilator. 4,072,143, Cl. 126-299.00D.
Gaylord Industries, Inc.: *See—*
Gaylord, Edson C., 4,072,143, Cl. 126-299.00D.
Gazzard, Warwick Henry; and Kearin, Roger Michael, to James Hardie & Coy. Pty. Limited. Embossed patterning of asbestos-cement and like sheets. 4,072,460, Cl. 425-471.000.
Gedney, Ronald Walker; and Rasile, John, to International Business Machines Corporation. Integrated circuit package. 4,072,816, Cl. 174-52.0FP.
Gemeines Forchungsinstitut Anstalt: *See—*
Meyrin, Paul, 4,072,124, Cl. 115-19.000.
General Dynamics Corporation: *See—*
Szabo, Robert L., 4,072,843, Cl. 219-91.210.
General Electric Company: *See—*
Bates, P. A.; Folsom, L. R.; and Haberstroh, A. J., 4,072,082, Cl. 89-162.000.
Crouch, Donald W.; and Kurtz, Donald R., 4,072,837, Cl. 200-144.00B.
Gleichman, Robert F., 4,072,872, Cl. 310-53.000.
Harris, Raymond W., 4,072,903, Cl. 325-466.000.
Jeram, Edward M., 4,072,635, Cl. 260-2.50S.
Kenworthy, Milton James; and Woltmann, Ivan Elmer, 4,072,008, Cl. 60-261.000.
True, Howard D. F., Jr., 4,072,374, Cl. 312-214.000.
General Electric Company Limited, The: *See—*
Barnaby, Bernard Sydney; Coe, Cyril Walter; Hall, Godfrey Stephen; and Leworthy, John Harwood, 4,072,224, Cl. 197-1.00R.
General Foods Corporation: *See—*
Scarsella, Edward Louis; and Spotholz, Clifford Henry, 4,072,765, Cl. 426-596.000.
General Motors Corporation: *See—*
Carroll, Luther E.; and Clement, James C., 4,072,360, Cl. 303-2.000.
McWhirter, Ralph A., 4,072,133, Cl. 123-52.0MV.
Pomerantz, Allen J., 4,072,924, Cl. 340-52.00F.
George, Wilberdan V.: *See—*
Coyne, Lawrence J.; George, Wilberdan V.; and Groner, Warren, 4,072,421, Cl. 356-39.000.
Geosource, Inc.: *See—*
Peterson, Jerry R., 4,072,051, Cl. 73-194.00M.
Gerson, Bernard: *See—*
Gerson, Howard S.; and Gerson, Bernard, 4,072,548, Cl. 156-79.000.
Gerson, Howard S.; and Gerson, Bernard. Panel door and method of construction. 4,072,548, Cl. 156-79.000.
Gibson, Sandra F.; and Rodgers, Gregory D., to McDonnell Douglas Corporation. *Klebsiella pneumoniae* and Enterobacter broth. 4,072,571, Cl. 195-100.000.
Gibson, Sandra F.: *See—*
Aldridge, Clifton; Gibson, Sandra F.; and Rodgers, Gregory D., 4,072,573, Cl. 195-100.000.
Gilbert, Roy E.: *See—*
Lucero, Andres R.; Gilbert, Roy E.; and Stevens, Jack H., 4,072,930, Cl. 340-152.00T.
Gillon, John: *See—*
Gates, Peter Stuart; Gillon, John; and Saggers, David Thomas, 4,072,495, Cl. 71-76.000.
Gillow, George B., to NCR Corporation. Hazard-free clocked master/-slave flip-flop. 4,072,869, Cl. 307-291.000.
Gilson Brothers Company: *See—*
Davies, John W., III; Enters, Edward W.; and DuPas, Eugene A., 4,071,922, Cl. 16-112.000.
Gimix, Inc.: *See—*
Phillips, Robert C., 4,072,824, Cl. 179-18.00B.
Gindler, E. Melvin, to Pierce Chemical Company. Uric acid determination. 4,072,627, Cl. 252-408.000.
Gitlin, Richard Dennis; and Thompson, John Stewart, to Bell Telephone Laboratories, Incorporated. Variable phase shifter for adaptive echo cancellers. 4,072,830, Cl. 179-170.200.
Givaudan Corporation: *See—*
Naegeli, Peter, 4,072,719, Cl. 260-617.00A.
GKN Floform Limited: *See—*
Waite, John Stuart, 4,072,817, Cl. 174-52.00H.
Glassman, Jacob A. Double-duty diaper and insert therefor. 4,072,150, Cl. 128-284.000.
Gleason, John Gerald; Holden, Kenneth George; and Huffman, William Francis, to SmithKline Corporation. Cis-4-oxoazetidine intermediates and methods of preparing them. 4,072,674, Cl. 260-239.00A.
Gleichman, Robert F., to General Electric Company. Ventilating air baffle and deflector for a dynamoelectric machine. 4,072,872, Cl. 310-53.000.
Globe-Union Inc.: *See—*
Burant, Leonard Joseph; and Daley, James Thomas, 4,072,801, Cl. 429-110.000.
Glory Kogyo Kabushiki Kaisha: *See—*
Abe, Masahiro, 4,072,156, Cl. 133-3.00F.
Kinoshita, Yoshio; and Iguchi, Masayuki, 4,072,223, Cl. 194-54.000.
Oshima, Takeo; and Kondo, Takashi, 4,072,854, Cl. 235-92.0SB.
Glover, Robert L. Guide attachment for portable power drills. 4,072,440, Cl. 408-112.000.
Glowe, Donald E.: *See—*
Johnson, Ben C.; Thornton, J. Scott; Glowe, Donald E.; Cassidy, Patrick E.; and Anderson, Robert E., 4,072,848, Cl. 219-528.000.
Godfrey, Nelson Frederick John, to ERG Industrial Corporation Limited. Electric slide switch having sliding contact with cleaning action. 4,072,834, Cl. 200-16.00C.
Godrick, Joseph A.; and Sliney, Joseph Leo, to Kennecott Copper Corporation. Method of fabricating a solar heating unit. 4,072,262, Cl. 228-265.000.
Goebeler, Robert: *See—*
Waldron, Clifford R.; Yonkers, Karl W.; Goebeler, Robert; Frear, David L.; and Bright, Edward J., 4,072,394, Cl. 339-276.00T.
Goetzewerke Friedrich Goetze AG: *See—*
Deutzmann, Klaus, 4,071,948, Cl. 29-809.000.

Goffe, William L.; and Mammino, Joseph, to Xerox Corporation. Migration imaging method. 4,072,517, Cl. 96-1.0PS.

Gold, Nicholas, to Polaroid Corporation. Photographic film cassette. 4,072,972, Cl. 354-275.000.

Golda, Eugene; Huang, Jen-chi; Shimazu, Ken-ichi; and Chu, Simon Long, to Polychrome Corporation. Process for electrolytic graining of aluminum sheet. 4,072,589, Cl. 204-129.400.

Golden, William: *See—*
McDermott, Robert E.; and Golden, William, 4,072,393, Cl. 339-272.0UC.

Golicz, Roman M.: *See—*
Gunther, William H., Jr.; Golicz, Roman M.; and Hough, James W., 4,071,997, Cl. 53-31.000.

Goloff, Alexander, to Caterpillar Tractor Co. Light-weight piston assemblies. 4,072,088, Cl. 92-220.000.

Goodhart, Rupert Richard Francis Gerard Heron, to Imperial Chemical Industries Limited. Method and apparatus for seismic prospecting. 4,072,208, Cl. 181-401.000.

Goodhue, Charles T.: *See—*
Masurekar, Prakash S.; and Goodhue, Charles T., 4,072,568, Cl. 195-65.000.

Goodlaxson, John D., to Maytag Company, The. Motor energized latch mechanism. 4,072,867, Cl. 307-118.000.

Goodman, Richard Martin: *See—*
Schiller, Arthur Maurice; Goodman, Richard Martin; and Neff, Roger Edgar, 4,072,607, Cl. 210-58.000.

Goodnight, Kenneth C., Jr.; Hartman, Grant H., Jr.; and Marquardt, Robert F., to Mead Johnson & Company. Loy phytate isoelectric precipitated soy protein isolate. 4,072,670, Cl. 260-123.500.

Goodyear Tire & Rubber Company, The: *See—*
Cogley, Richard J., Jr., 4,072,645, Cl. 260-29.70M.
Creekmore, Mark D.; Vielhaber, Edward T.; and Carter, Russell P., Jr., 4,072,790, Cl. 428-220.000.
Kline, Richard H., 4,072,654, Cl. 260-45.9QB.
Lammers, Peter C., 4,072,673, Cl. 264-225.000.
Parker, Dane K., 4,072,724, Cl. 260-624.00B.
Pierson, Robert M.; and Lovell, John A., 4,072,738, Cl. 264-102.000.
Stalter, Joseph F., Jr., 4,072,550, Cl. 156-123.00R.
Sturm, Budd Harvey; and Slam, Thomas James, 4,072,721, Cl. 260-621.00A.

Gordini, Silvano: *See—*
Beranger, Alessandro; Balducci, Agostino; and Gordini, Silvano, 4,072,739, Cl. 423-8.000.

Gorynin, Igor Vasilievich: *See—*
Zorev, Nikolai Nikolaevich; Astafiev, Anatoly Alexandrovich; Loboda, Alexandr Sergeevich; Savukov, Vladimir Pavlovich; Runov, Andrei Efimovich; Belov, Vladimir Alexandrovich; Sobolev, Jury Vasilievich; Sobolev, Valentin Vasilievich; Pavlov, Nikolai Mikhailovich; Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Balandin, Jury Fedorovich; Gorynin, Igor Vasilievich; Zvezdin, Jury Ivanovich; Ivanov, Kuzma Makeevich; Ignatov, Viktor Alexandrovich; and Emelyanenko, July Georgievich, 4,072,509, Cl. 75-124.000.

Goto, Kazuo: *See—*
Araki, Kunio; Sasaki, Takashi; Kasahara, Yuko; Yamashita, Yoshisada; Yotumoto, Keiichi; Sunaga, Hiromi; Tabei, Kiyoshi; Goto, Kazuo; Tajiri, Kunio; and Kittaka, Hirokama, 4,072,792, Cl. 428-246.000.

Goto, Toshihiro: *See—*
Nomura, Kenji; Yoshioka, Kengo; and Goto, Toshihiro, 4,072,236, Cl. 214-1.0BB.

Gould Inc.: *See—*
McConnell, Lorne D.; and Kucharski, Leonard J., 4,072,392, Cl. 339-258.00R.

Gow, James Gordon; and England, Alan Gordon, to Ingerthorpe Holdings Limited. Production of solutions. 4,072,610, Cl. 210-90.000.

Granade, John J.: *See—*
Chambers, Richard F.; and Granade, John J., 4,072,595, Cl. 204-219.000.

Grant, Robert Eugene, to Minnesota Mining and Manufacturing Company. Audio-visual presentation device. 4,072,989, Cl. 360-80.000.

Grantham, William G.: *See—*
Taylor, John S.; and Grantham, William G., 4,072,785, Cl. 428-536.000.

Granzow, Robert H.; and Marvin, Richard P., to NCR Corporation. Method and apparatus for embossing diffraction gratings on a record medium. 4,072,098, Cl. 101-32.000.

Gray, Robin Th.: *See—*
Reinhoudt, David N.; and Gray, Robin Th., 4,072,693, Cl. 260-338.000.

Green, David Frederick: *See—*
Hill, Joseph Henry; and Green, David Frederick, 4,072,371, Cl. 308-56.000.

Greenwood, Edward L. Dumpable rain gutter system. 4,072,285, Cl. 248-48.200.

Grefco, Inc.: *See—*
Stewart, Sherman A.; and Snyder, Estel Ray, 4,071,993, Cl. 52-309.500.

Griepentrog, Hartmut: *See—*
Gass, Hans; Hintermann, Hans Erich; and Griepentrog, Hartmut, 4,072,797, Cl. 428-409.000.

Grier, John D., Sr., to Bala Electronics Corporation. Copper thick film conductor. 4,072,771, Cl. 427-96.000.

Griesser, Rolf: *See—*
Bohler, Hans; and Griesser, Rolf, 4,072,700, Cl. 260-438.100.

Griewahn, Carl O.: *See—*
Zolman, Junior O.; and Griewahn, Carl O., 4,071,934, Cl. 29-157.30A.

Griffing, Brandt Mead: *See—*
Garcia, Joe La; Griffing, Brandt Mead; Hu, Paul Yu-Fei; and Millington, Richard George, 4,072,101, Cl. 101-93.150.

Griffith, Bobby D., to Caterpillar Tractor Co. Shear pin assembly for counterweights. 4,072,324, Cl. 280-759.000.

Grimm, Harald: *See—*
Ferse, Armin; and Grimm, Harald, 4,072,591, Cl. 204-159.200.

Grinshtein, Vladimir Yakovlevich: *See—*
Volman, Mikhail Yakovlevich; Grinshtein, Vladimir Yakovlevich; Zhukov, Mikhail Leonidovich; Kuchuk, Ivan Anatolievich; and Polovinkin, Evgeny Petrovich, 4,072,999, Cl. 361-333.000.

Grip, Carl Erik: *See—*
Santen, Sven; and Grip, Carl Erik, 4,072,502, Cl. 75-11.000.

Groner, Warren: *See—*
Coyne, Lawrence J.; George, Wilberdan V.; and Groner, Warren, 4,072,421, Cl. 356-39.000.

Grosso, Vincent Gerard, to American Cyanamid Company. Preparation of 3,5-dialkyl-4-hydroxybenzoic acid. 4,072,707, Cl. 260-521.00C.

Groswith, Charles T., III; and Woodley, Ralph M., to Velo-Bind, Inc. Wrap-around cover for books. 4,072,326, Cl. 281-29.000.

Gruppo Lepetit S.p.A.: *See—*
Tarzia, Giorgio, 4,072,689, Cl. 260-307.00R.

Gryga, John J., Jr.: *See—*
Swenson, Richard F.; Eimen, Shawn H.; and Gryga, John J., Jr., 4,072,287, Cl. 248-399.000.

Gsell, Laurenz: *See—*
Farooq, Saleem; Drabek, Jozef; Gsell, Laurenz; Karrer, Friedrich; and Meyer, Willy, 4,072,752, Cl. 424-304.000.

GTE Automatic Electric Laboratories Incorporated: *See—*
Daebler, Donald H., 4,072,177, Cl. 140-105.000.
Morgan, John H., 4,072,077, Cl. 83-418.000.

GTE Laboratories Incorporated: *See—*
Stone, Samuel M., 4,072,858, Cl. 250-205.000.

Guarino, John P.: *See—*
Due, George B.; and Guarino, John P., 4,072,592, Cl. 204-159.150.

Gudat, Wolfgang; and Ruhnau, Gerhard, to WABCO Westinghouse GmbH. Compensating circuit arrangement in a wheel anti-skid brake control system to obtain corresponding measured values of the duration of the half cycle alternations of a wheel generated voltage. 4,072,364, Cl. 303-95.000.

Guibet, Jean-Pierre: *See—*
Carre, Christian; Guibet, Jean-Pierre; Rebours, Albert; and Rigal, Andre, 4,072,484, Cl. 55-379.000.

Guidinger, Dewayne C.: *See—*
Christen, Urs; and Guidinger, Dewayne C., 4,072,846, Cl. 219-497.000.

Guillaume, Jacques: *See—*
Nedelec, Lucien; Guillaume, Jacques; and Dumont, Claude, 4,072,685, Cl. 260-293.810.

Gujer, Hans. Method and device for the wet composting of organic sludge. 4,072,494, Cl. 71-9.000.

Gulf Oil Canada Limited: *See—*
Kizior, Thaddeus Eugene, 4,072,609, Cl. 210-73.00R.

Gulf Research & Development Company: *See—*
Lakshmanan, Pallavoor R.; Swift, Harold E.; and Wu, Ching Yong, 4,072,808, Cl. 526-76.000.

Gunn, Jerome A.: *See—*
Morrell, Roger J.; Gunn, Jerome A.; and Wilson, Richard J., 4,072,015, Cl. 61-35.000.

Gunther Business Systems, Inc.: *See—*
Gunther, William H., Jr.; Golicz, Roman M.; and Hough, James W., 4,071,997, Cl. 53-31.000.

Gunther, Gerd-Joachim, to Siemens Aktiengesellschaft. Apparatus for coding input data characters. 4,072,820, Cl. 178-23.00R.

Gunther, William H., Jr.; Golicz, Roman M.; and Hough, James W., to Gunther Business Systems, Inc. Mechanism and method of making an envelope. 4,071,997, Cl. 53-31.000.

Gutehoffnungshutte Sterkrade Aktiengesellschaft: *See—*
Gass, Hans; Hintermann, Hans Erich; and Griepentrog, Hartmut, 4,072,797, Cl. 428-409.000.

Guttman, Thomas, to United States of America, Army. Method of indicating the relative roughness of a surface. 4,072,425, Cl. 356-209.000.

Guy, Stephen L.: *See—*
James, Forrest T.; and Guy, Stephen L., 4,072,775, Cl. 427-373.000.

Guz, Dmitry Semenovich: *See—*
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.

Haag, Michael; and Pichler, Herman P., to Rixson-Firemark, Inc. Switch actuating hinge. 4,072,917, Cl. 335-205.000.

Haag, Werner O.; and Whitehurst, Darrell Duayne, to Mobil Oil Corporation. Production of alcohol. 4,072,720, Cl. 260-618.00H.

Haberstroh, A. J.: *See—*
Bates, P. A.; Folsom, L. R.; and Haberstroh, A. J., 4,072,082, Cl. 89-162.000.

Habiger, Cyril W., to Caterpillar Tractor Co. Check valve with torsion spring and method of assembly. 4,072,167, Cl. 137-535.000.

Hacker, Heinz: *See—*
Kleeberg, Wolfgang; Hacker, Heinz; and Hauschildt, Klaus-Robert, 4,072,804, Cl. 526-11.200.

Haffer, Gregor: *See—*
Sauer, Gerhard; Hauser, Helmut; Haffer, Gregor; Ruppert, Juergen; Eder, Ulrich; and Wiechert, Rudolf, 4,072,716, Cl. 260-586.00F.

Hagedorn, Henry, Jr.: *See—*
Lewis, William; Weldon, Peter J.; Hagedorn, Henry, Jr.; Hayes, Thomas E.; and Israels, Sylvan H., 4,072,108, Cl. 102-70.20R.

Hahm, Heinz Guenter; and Neef, Klaus, to ITT Industries, Incorporated. Multi-part disc brake. 4,072,219, Cl. 188-218.0XL.

Halbritter, Guenter; Muehlthaler, Wolfgang; Sperber, Heinrich; Diem, Hans; Dudeck, Christian; and Lehmann, Gunter, to BASF Aktiengesellschaft. Manufacture of formaldehyde. 4,072,717, Cl. 260-603.00C.

Hales, Eric Charles, to Automotive Products Limited. Valve devices for use in liquid pressure braking systems of vehicles. 4,072,361, Cl. 303-6.00C.

Hall, David John: *See—*
Fulker, John Leslie; Hall, David John; and Lock, Robert Christopher, 4,072,282, Cl. 244-35.00R.

Hall, Godfrey Stephen: *See—*
Barnaby, Bernard Sydney; Coe, Cyril Walter; Hall, Godfrey Stephen; and Leworthy, John Harwood, 4,072,224, Cl. 197-1.00R.

Hall, Robert Eugene. Load carrying apparatus. 4,072,257, Cl. 224-29.00R.

Hallcher, Richard C.; Baizer, Manuel M.; and White, Donald A., to Monsanto Company. Electrolytic carboxylation of carbon acids via electrogenerated bases. 4,072,583, Cl. 204-59.00R.

Halliburton Company: *See—*
Cole, Robert Clay; Koch, Ronney R.; and Ramos, Joseph, 4,072,194, Cl. 166-295.000.

Hamada, Hideo, to Nissan Motor Company, Limited. Apparatus for controlling actuating fluid pressure on vehicular friction clutch with compensation for decrease in friction coefficient at elevated temperature. 4,072,220, Cl. 192-.075.

Hamamoto, Toshikazu: *See—*
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, 4,072,722, Cl. 260-621.00G.

Hamid, Michael A.; and Sandoz, Oscar A., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Underwater monitoring. 4,072,941, Cl. 343-5.0NA.

Hamilton, James T., to Jaham Mfg. Co., Inc. Grain probe. 4,072,059, Cl. 73-423.00R.

Hamilton, Willard C.: *See—*
Scouten, Charles G.; and Hamilton, Willard C., 4,072,521, Cl. 96-1.50R.

Hammersmith, James R., to Brown & Williamson Tobacco Corporation. Sheet material. 4,072,789, Cl. 428-195.000.

Hampson, James W.: *See—*
Luddy, Francis E.; Hampson, James W.; Herb, Samuel F.; and Rothbart, Herbert L., 4,072,766, Cl. 426-607.000.

Hamstra, David C.: *See—*
Hiller, Trueman W.; and Hamstra, David C., 4,072,934, Cl. 340-243.000.

Hansen, Franklin A., to Continental Disc Corporation. Scored reverse buckling rupture disc assembly. 4,072,160, Cl. 137-68.00R.

Hansen, Kenneth N., to Allis-Chalmers Corporation. Clamp style wheel bushing. 4,072,357, Cl. 301-1.000.

Hanson, Donald N.; and Wilke, Charles R., to University of California, The Regents of the. Electrostatic precipitation process. 4,072,477, Cl. 55-10.000.

Hanson, William J., to Xerox Corporation. Screen for an electrophotographic printing machine. 4,072,414, Cl. 355-4.000.

Haraikawa, Tetsuo; and Karasudani, Yasuo, to Tokico Ltd. Disc brake with non-deformable yoke. 4,072,214, Cl. 188-72.400.

Haraikawa, Tetsuo, to Tokico Ltd. Disc brake guiding and support structure. 4,072,216, Cl. 188-73.300.

Haramoto, Yutaka; Nisikawa, Kazunori; and Yamazaki, Masami, to Victor Company of Japan, Ltd. Compression and expansion system with enlarged dynamic range. 4,072,914, Cl. 333-14.000.

Harari, Eliyahou, to Hughes Aircraft Company. Gate protection device for MOS circuits. 4,072,976, Cl. 357-23.000.

Harb, Mitchell A. Dual tire cutting machine. 4,072,072, Cl. 82-86.000.

Harco Products, Inc.: *See—*
Harder, Dane Jay, 4,072,272, Cl. 239-676.000.

Harder, Dane Jay, to Harco Products, Inc. Multi-purpose spreader. 4,072,272, Cl. 239-676.000.

Hardouin, Serge: *See—*
Costes, Jean-Raymond; Strini, Jean-Claude; and Hardouin, Serge, 4,072,728, Cl. 260-660.000.

Harger, Virginia Ruth: *See—*
O'Brien, Thomas J.; Parsons, David A.; and Harger, Virginia Ruth, 4,072,158, Cl. 135-1.00R.

Hargis, Duane C.; and Kehoe, Lawrence J., to Ethyl Corporation. Conversion of methanol and dimethyl ether to C_2-C_6 monoolefins using a partially hydrated zirconium sulfate catalyst. 4,072,732, Cl. 260-682.000.

Hargis, Duane C.; and Kehoe, Lawrence J., to Ethyl Corporation. Conversion of methanol and dimethyl ether. 4,072,733, Cl. 260-682.000.

Harley, A. Leonard: *See—*
Chambers, Derek; and Harley, A. Leonard, 4,073,004, Cl. 363-79.000.

Harlow, David Arthur; and Wood, Gillies, to Bentley Engineering Company Limited, The. Racking mechanisms. 4,072,029, Cl. 66-154.00R.

Harmansky, Absolon: *See—*
Kostura, Michal; Pandula, Jan; Harmansky, Absolon; Smiga, Slavomir; and Kepic, Stefan, 4,072,181, Cl. 164-154.000.

Harmony Emitter Company, Inc.: *See—*
Harmony, Richard C., 4,072,270, Cl. 239-428.500.

Harmony, Richard C., to Harmony Emitter Company, Inc. Shower head aerator. 4,072,270, Cl. 239-428.500.

Harris, Frank N. Oil and water separators. 4,072,614, Cl. 210-305.000.

Harris-Intertype Corporation: *See—*
Schaffer, Robert H., 4,072,104, Cl. 101-248.000.

Harris, Raymond W., to General Electric Company. Storage circuit for paging radio receivers. 4,072,903, Cl. 325-466.000.

Hartgerink, Ronald L.: *See—*
Schlosberg, Richard H.; Wright, Franklin J.; and Hartgerink, Ronald L., 4,072,475, Cl. 48-210.000.

Hartig, Wolfgang: *See—*
Walther, Herbert; Hartig, Wolfgang; Friedrich, Adolf; and Raue, Roderich, 4,072,911, Cl. 331-94.50L.

Hartley, Dennis, to Coal Industry (Patents) Limited. Steering of mining machines. 4,072,349, Cl. 299-1.000.

Hartman, Grant H., Jr.: *See—*
Goodnight, Kenneth C., Jr.; Hartman, Grant H., Jr.; and Marquardt, Robert F., 4,072,670, Cl. 260-123.500.

Hartmann, Ludwig A., to ICI Americas Inc. Glycidyl ethers derived from 3,3',5,5'-tetraalkyl-4,4'-dihydroxybiphenyl. 4,072,656, Cl. 260-47.0EN.

Harvard Industries, Inc.: *See—*
Snyder, Richard V., 4,072,913, Cl. 333-6.000.

Hase, Shinobu: *See—*
Suda, Kyo; Takami, Katsumi; Shintani, Akira; and Hase, Shinobu, 4,072,767, Cl. 427-8.000.

Hasegawa, Hiroshi: *See—*
Masunaga, Midori; Kohno, Yoshiki; and Hasegawa, Hiroshi, 4,072,620, Cl. 252-63.000.

Hashimoto, Akira: *See—*
Nakata, Tetsuya; Yamada, Nobuo; Hashimoto, Akira; Takata, Yasuto; and Bunnomori, Yukinari, 4,072,734, Cl. 260-873.000.

Hassell, David Allen: *See—*
Zimmer, Elvis Simon; and Hassell, David Allen, 4,072,093, Cl. 99-443.00R.

Hattori, Tadashi; Takada, Akira; Nakase, Takamichi; and Sugi, Fumio, to Nippon Soken, Inc.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Air-to-fuel ratio adjusting system for an internal combustion engine. 4,072,137, Cl. 123-119.0DB.

Hauschildt, Klaus-Robert: *See—*
Kleeberg, Wolfgang; Hacker, Heinz; and Hauschildt, Klaus-Robert, 4,072,804, Cl. 526-11.200.

Hausen, Peter; and Schulz, Klaus-Dieter, to Hoesch Werke Aktiengesellschaft. Method of slagging molten metal. 4,072,505, Cl. 75-61.000.

Hauser, Helmut: *See—*
Sauer, Gerhard; Hauser, Helmut; Haffer, Gregor; Ruppert, Juergen; Eder, Ulrich; and Wiechert, Rudolf, 4,072,716, Cl. 260-586.00F.

Hausmann, Herbert H.: *See—*
Kratcoski, Frank L.; and Hausmann, Herbert H., 4,072,410, Cl. 353-68.000.

Hawes, Russell B.: *See—*
Bianco, Joseph F.; Senio, Nicholas; Hawes, Russell B.; and Strang, Donald B., 4,072,944, Cl. 343-7.0PF.

Hawkins, Clyde C.; and Hawkins, Jesse R., to Hawkins Enterprises, Inc. Fuel system. 4,072,138, Cl. 123-122.00E.

Hawkins Enterprises, Inc.: *See—*
Hawkins, Clyde C.; and Hawkins, Jesse R., 4,072,138, Cl. 123-122.00E.

Hawkins, Jesse R.: *See—*
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Hay, Johnny L. Rotary gas pressure engine system. 4,072,445, Cl. 417-379.000.

Hayami, Heijiro; Tsuchiya, Hiroyoshi; Yoshida, Kunio; Tsuda, Yukifumi; and Kanno, Yoshimitsu, to Matsushita Electric Industrial Co., Ltd. Ink injection type writing system using amplitude-modulated electrical signals. 4,072,958, Cl. 346-140.00R.

Hayashi, Shizuo: *See—*
Sekine, Hisashi; Yamamoto, Akira; and Hayashi, Shizuo, 4,072,697, Cl. 260-397.250.

Hayden, David E.; and Foucht, Millard E., to Owens-Corning Fiberglas Corporation. Polyurethane foam system. 4,072,623, Cl. 252-182.000.

Hayes, John C., to UOP Inc. Dehydrogenation method and nonacidic multimetallic catalytic composite for use therein. 4,072,602, Cl. 208-138.000.

Hayes, Thomas E.: *See—*
Lewis, William; Weldon, Peter J.; Hagedorn, Henry, Jr.; Hayes, Thomas E.; and Israels, Sylvan H., 4,072,108, Cl. 102-70.20R.

Hazelton, Burton W., to Hazelton Products, Inc. Clutch-brake unit for

a press and method and jig for installing the same. 4,071,940, Cl. 29-468.000.
Hazelton Products, Inc.: *See*—
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Heath, Ronald Alfred, to Lucas Industries Limited. Control valve arrangements for variable stroke pumps. 4,072,443, Cl. 417-218.000.
Heaton, G. Norman: *See*—
Marsman, John W.; and Heaton, G. Norman, 4,072,232, Cl. 206-602.000.
Heckman, Russell William: *See*—
Braker, Frederick Williams; Heckman, Russell William; Nickey, George Allen; and Potter, Terry Clair, 4,072,553, Cl. 156-423.000.
Hedegaard, Kurt, to Pharmacia AS. Bronchospasmolytic phenylethanolamines. 4,072,760, Cl. 424-330.000.
Hedrick, Ross M., to Monsanto Company. Water based printing ink. 4,072,644, Cl. 260-29.6HN.
Heidelberger Druckmaschinen AG: *See*—
Junghans, Rudi; and Beisel, Hermann, 4,072,106, Cl. 101-425.000.
Heidenreich & Harbeck Zweigniederlassung der Gildemeister AG: *See*—
Appel, Adolf; and Reymann, Wolfgang, 4,072,456, Cl. 425-183.000.
Heidergren, Lars, to AB Gylling & Co. Message synthetizer. 4,072,986, Cl. 360-12.000.
Heimrich, Helmut: *See*—
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Heinen, Harold J.; Peterson, David G.; and Lindstrom, Roald E., to United States of America, Interior. Separate recovery of silver and gold from cyanide solutions. 4,072,587, Cl. 204-110.000.
Heiser, Joachim; Hoheisel, Rainer; Flaschar, Heinz; Gand, Heinz; Kleinschmidt, Heinz; Braunlinger, Konrad; Sopha, Klaus; Schempp, Roland; and Sanzenbacher, Hermann, to Robert Bosch GmbH. Hydraulic control system. 4,072,169, Cl. 137-596.130.
Heisler, Raymond A. Apparatus and method for automatically feeding and erecting folded cartons. 4,072,090, Cl. 93-53.00M.
Helfgott, Samson: *See*—
Hirshaut, Yashar, 4,072,577, Cl. 195-104.000.
Heller, Larry E.; Shriver, Joe E.; and Lindblom, Curtis H., to Sperry Rand Corporation. Rotary severing mechanism for a row crop header. 4,072,002, Cl. 56-53.000.
Heller, Lawrence Griffith; and Terman, Lewis Madison, to International Business Machines Corporation. Analog-to-digital and digital-to-analog converter circuits employing charge redistribution. 4,072,939, Cl. 340-347.0AD.
Hellman, Robert R.; and French, Douglas M., to Westport International. Remote control radio system. 4,072,898, Cl. 325-37.000.
Helms, Hosea W. Corner protector. 4,072,231, Cl. 206-453.000.
Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA): *See*—
Kuhling, Dieter; Huppertz, Josef; Krings, Peter; and Reuter, Herbert, 4,072,622, Cl. 252-179.000.
Henshall, John Barry: *See*—
Garner, Robert; Henshall, John Barry; and Petitpierre, Jean-Claude, 4,072,690, Cl. 260-326.14R.
Henzi, Beat, to Sandoz Ltd. Cationic dyes containing an aryloxy group linked through a bridging radical to a quaternized nitrogen atom. 4,072,672, Cl. 260-205.000.
Hepworth Plastics Limited: *See*—
Elliott, David Robert, 4,072,328, Cl. 285-169.000.
Her Majesty the Queen in right of the Province of Alberta, Government of the Province of Alberta, Department of Energy and Natural Resources, Alberta Syncrude Equity: *See*—
Kizior, Thaddeus Eugene, 4,072,609, Cl. 210-73.00R.
Herb, Samuel F.: *See*—
Luddy, Francis E.; Hampson, James W.; Herb, Samuel F.; and Rothbart, Herbert L., 4,072,766, Cl. 426-607.000.
Hercules Incorporated: *See*—
Winer, Richard, 4,072,546, Cl. 149-19.800.
Hermann, David Trimble, to American Cyanamid Company. Cellulosic textile treated with low formaldehyde fully etherified methylolated melamine with urea-formaldehyde-glyoxal. 4,072,466, Cl. 8-183.000.
Hermans, Johny C., to S.A. Texaco Belgium N.V. Novel process. 4,072,633, Cl. 260-2.00N.
Hershman, Arnold; and Gambell, James W., to Monsanto Company. Oxidation of phosphonomethylamines. 4,072,706, Cl. 260-502.500.
Herweg, Peter; and Barthel, Werner, to Bayer Aktiengesellschaft. Insulating elements for walls and ceilings. 4,072,788, Cl. 428-139.000.
Hess, Peter: *See*—
Rampel, Hans; Hess, Peter; and Becker, Herbert, 4,071,978, Cl. 49-348.000.
Hett, John H., to American Cystoscope Makers Inc. Radiation endoscope. 4,072,147, Cl. 128-006.000.
Hey, Hansjorg: *See*—
Muller, Werner Heinrich; Hey, Hansjorg; and Weil, Tomas, 4,072,660, Cl. 260-621.00H.
Hickman, John B., to W. P. Hickman Company, Inc. Gravel stop. 4,071,987, Cl. 52-94.000.
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Yasue, Motoi; Tagawa, Yoshikazu; and Higashi, Mitsuo, 4,072,783, Cl. 428-341.000.
Higgins, John J: *See*—
O'Farrell, Charles P.; and Higgins, John J., 4,072,648, Cl. 260-33.4PQ.
Higgins, John Tyson, to Cominco Ltd. Recovery of ammonia from underground storage. 4,072,024, Cl. 62-50.000.
Hijikata, Akiko: *See*—
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,743, Cl. 424-177.000.
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuno; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,744, Cl. 424-177.000.
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,757, Cl. 424-267.000.
Hildebrandt, Ullrich, to Linde Aktiengesellschaft. Cable connection for low-temperature cable. 4,072,815, Cl. 174-15.00S.
Hill, Joseph Henry; and Green, David Frederick, to Vandervell Products Limited. Bearings for railway vehicle axles. 4,072,371, Cl. 308-56.000.
Hiller, Trueman W.; and Hamstra, David C., to Wylain, Inc. Method and apparatus for detecting a blockage in a vapor flow line. 4,072,934, Cl. 340-243.000.
Hinkle, Richard E., to American Hydrotherm Corporation. Process and apparatus for the cyclic heating and cooling of processing equipment. 4,072,184, Cl. 165-18.000.
Hinsche, Friedrich; and Schaupp, Kurt, to Bayer Aktiengesellschaft. Production of floor toppings by flowing inorganic binder suspensions over porous open-cell underlays. 4,072,786, Cl. 428-537.000.
Hintermann, Hans Erich: *See*—
Gass, Hans; Hintermann, Hans Erich; and Griepentrog, Hartmut, 4,072,797, Cl. 428-409.000.
Hirame, Yasutel; and Nakamura, Youichi, to Fuji Chemical Industries Company. Refractory furnace wall coating. 4,072,530, Cl. 106-44.000.
Hirasaka, Toshio: *See*—
Tsuto, Keiichi; Majima, Kanji; and Hirasaka, Toshio, 4,072,470, Cl. 23-284.000.
Hirata, Noritsugu; Takigawa, Tomoshi; and Ishikawa, Kazuo, to Canon Kabushiki Kaisha. Release device of motion picture camera. 4,072,409, Cl. 352-174.000.
Hirshaut, Yashar, to Helfgott, Samson; and Benjamin, Jack W. Method and miniaturized apparatus for cultivating bacteria. 4,072,577, Cl. 195-104.000.
Hisada, Toshihiko: *See*—
Muto, Kiyoshi; Hisada, Toshihiko; Ohmori, Nobutsugu; Bessho, Satoshi; Mori, Naoharu; and Ishikawa, Katsuhiko, 4,071,996, Cl. 52-741.000.
Hitachi, Ltd.: *See*—
Ishida, Masahiko; Oguri, Yoshitaka; Shimizu, Norio; and Muroi, Tadashi, 4,072,667, Cl. 260-112.00R.
Suda, Kyo; Takami, Katsumi; Shintani, Akira; and Hase, Shinobu, 4,072,767, Cl. 427-8.000.
Hoechst Aktiengesellschaft: *See*—
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Kramer, Karl; and Durst, Karlheinz, 4,072,233, Cl. 206-634.000.
Linke, Fritz; Dursch, Walter; and Kleiner, Hans-Jerg, 4,072,776, Cl. 427-390.00D.
Muller, Werner Heinrich; Hey, Hansjorg; and Weil, Tomas, 4,072,660, Cl. 260-621.00H.
Ritz, Jurgen; Zimmermann, Rolf; and Fischer, Hannes, 4,072,642, Cl. 260-22.0CB.
Rochlitz, Jurgen; and Schon, Gunter, 4,072,520, Cl. 96-1.50R.
Schlafer, Ludwig; and Opitz, Konrad, 4,072,463, Cl. 8-41.00B.
Hoehn, Hans: *See*—
Denzel, Theodor; and Hoehn, Hans, 4,072,679, Cl. 260-256.40F.
Denzel, Theodor; and Hoehn, Hans, 4,072,680, Cl. 260-256.40F.
Denzel, Theodor; and Hoehn, Hans, 4,072,681, Cl. 260-256.40F.
Hoehn, Robert A., to Mid-West Conveyor Company, Inc. Conveyor carrier with actuated dog. 4,072,11₁, Cl. 104-172.00S.
Hoesch Werke Aktiengesellschaft: *See*—
Heusen, Peter; and Schulz, Klaus-Dieter, 4,072,505, Cl. 75-61.000.
Kowallik, Josef, 4,071,942, Cl. 29-469.500.
Hoffman, John Ronald; and Marsland, Peter John, to American Cyanamid Company. Short-crimp surgical needle. 4,072,041, Cl. 72-416.000.
Hoffman-La Roche Inc.: *See*—
Dabal, Dennis Joseph; and Williams, Joseph James, 4,072,551, Cl. 156-378.000.
Hoffman, Richard A.: *See*—
Kramer, William E.; Hopkins, Richard H.; and Hoffman, Richard A., 4,072,782, Cl. 428-409.000.
Tanaka, Tadashi; Okamoto, Akira; Kouno, Takashi; Kramer, William E.; Hopkins, Richard H.; and Hoffman, Richard A., 4,072,657, Cl. 260-47.0UA.
Hoffmann, Herwig: *See*—
Voges, Dieter; Baer, Karl; Boudier, Juergen; Winderl, Siegfried; and Hoffmann, Herwig, 4,072,714, Cl. 260-584.00R.
Hoffmann-La Roche Inc.: *See*—
Boguth, Walter; Leuenberger, Hans Georg Wilhelm; Mayer, Hans Johann; Widmer, Erich; and Zell, Reinhard, 4,072,715, Cl. 260-586.00R.
Maestrone, Gian Paolo; and Mitrovic, Milan, 4,072,749, Cl. 424-273.00R.
Wehrli, Pius Anton, 4,072,723, Cl. 260-621.00H.
Hofmann, Dolf Dieter: *See*—
Oberpriller, Jakob; and Hofmann, Dolf Dieter, 4,072,026, Cl. 62-63.000.
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Hogan, James A.; and Sklaroff, Morton, to Honeywell Inc. Digital computer monitoring and restart circuit. 4,072,852, Cl. 235-303.100.

Hoheisel, Rainer: *See—*
Heiser, Joachim; Hoheisel, Rainer; Flaschar, Heinz; Gand, Heinz; Kleinschmidt, Heinz; Braunlinger, Konrad; Sopha, Klaus; Schempp, Roland; and Sanzenbacher, Hermann, 4,072,169, Cl. 137-596.130.

Holden, Kenneth George: *See—*
Gleason, John Gerald; Holden, Kenneth George; and Huffman, William Francis, 4,072,674, Cl. 260-239.00A.

Holmes, John, to William Machinery Limited. Breaker apparatus. 4,072,354, Cl. 299-37.000.

Homuth, Kenneth C. Hydraulic cylinder with concentricaly maintained piston and rod. 4,072,434, Cl. 403-263.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Yashima, Michio; Senzaki, Takaya; and Kurihara, Norimitsu, 4,072,925, Cl. 340-52.00F.

Honegger, Werner; and Muller, Erwin, to Ferag AG. Apparatus for evening an imbricated stream of printed products. 4,072,228, Cl. 198-459.000.

Honeywell Inc.: *See—*
Beiter, Glenn A., 4,072,883, Cl. 318-257.000.
Hogan, James A.; and Sklaroff, Morton, 4,072,852, Cl. 235-303.100.
Kabat, John L., 4,072,866, Cl. 307-41.000.
Westbrook, L. V.; and Payne, R. L., 4,072,890, Cl. 323-22.00R.
Whitehead, Robert C., Jr., 4,072,058, Cl. 73-720.000.

Honeywell Information Systems Inc.: *See—*
Barlow, George J.; and Nibby, Chester M., Jr., 4,072,853, Cl. 235-312.000.
Wilson, Edward A.; and Fredenberg, James D., 4,072,188, Cl. 165-80.000.

Hoornstra, Clayton W.; and Stevens, Violete L., to Dow Chemical Company, The. Gelled photopolymer composition and methods of making them. 4,072,529, Cl. 96-115.00R.

Hopkins, Richard H.: *See—*
Kramer, William E.; Hopkins, Richard H.; and Hoffman, Richard A., 4,072,782, Cl. 428-409.000.
Tanaka, Tadashi; Okamoto, Akira; Kouno, Takashi; Kramer, William E.; Hopkins, Richard H.; and Hoffman, Richard A., 4,072,657, Cl. 260-47.0UA.

Horisberger, Marc; and Olofsson, Mats, to Societe d'Assistance Technique pour Produits Nestle S.A. Isolation of cystoplasmic proteins using chitosan. 4,072,666, Cl. 260-112.00R.

Horiuchi, Takeshi. Variable delivery hydraulic pump. 4,072,442, Cl. 417-218.000.

Horn, Herwig, to Pluss-Staufer AG; and Zentrum fur Elektronemikroskopie. Method and apparatus for determining the reflective properties of surfaces, especially coated surfaces. 4,072,426, Cl. 356-212.000.

Horn, Vladimir: *See—*
Buran, Vojtech; and Horn, Vladimir, 4,072,175, Cl. 139-455.000.

Hoshiyama, Masao: *See—*
Ikezaki, Muneyoshi; Ito, Nobuo; Okazaki, Yasushi; Hoshiyama, Masao; Nagao, Taku; and Nakajima, Hiromichi, 4,072,759, Cl. 424-330.000.

Houdek, Calvin D.: *See—*
McLay, Gerald M.; Houdek, Calvin D.; and Yancey, Charles B., 4,072,825, Cl. 179-18.00B.

Hough, James W.: *See—*
Gunther, William H., Jr.; Golicz, Roman M.; and Hough, James W., 4,071,997, Cl. 53-31.000.

Hoult, Frederick Herbert, to W. H. Booth & Co. Limited. Process and mould for casting multiple articles. 4,072,180, Cl. 164-130.000.

House of Hints Corporation: *See—*
Chernewski, Albert J., 4,071,976, Cl. 47-39.000.

Howes, Randolph M. Venous catheter device. 4,072,146, Cl. 128-2.05D.

Hrabak, Frantisek; Bezdek, Milan; Hynkova, Vlasta; and Bouchal, Karel, to Ceskoslovenska akademie ved. Method for producing polymers. 4,072,805, Cl. 526-43.000.

Hu, Paul Yu-Fei: *See—*
Garcia, Joe La; Griffing, Brandt Mead; Hu, Paul Yu-Fei; and Millington, Richard George, 4,072,101, Cl. 101-93.150.

Huang, Barney K. Automatic seed singulating and dispensing apparatus. 4,072,251, Cl. 222-333.000.

Huang, Jen-chi: *See—*
Golda, Eugene; Huang, Jen-chi; Shimazu, Ken-ichi; and Chu, Simon Long, 4,072,589, Cl. 204-129.400.

Hudimac, George S., to Mechanical Service Company, Inc. Stacked, plug-in relays. 4,072,389, Cl. 339-119.00R.

Huffman, William Francis: *See—*
Gleason, John Gerald; Holden, Kenneth George; and Huffman, William Francis, 4,072,674, Cl. 260-239.00A.

Hughes Aircraft Company: *See—*
Harari, Eliyahou, 4,072,976, Cl. 357-23.000.

Hulligan, Jeffrey A., to J. P. Suggins Mobile Welding. Slip joint for disposal chute. 4,071,991, Cl. 52-204.000.

Hung, Jui Jung. Electric plug formed by squeezing assembly. 4,072,391, Cl. 339-196.00R.

Hunsucker, Jerry Hoyt, to IMC Chemical Group, Inc. Method of controlling the growth of bacteria and fungi using N-hydroxymethylalkylene diamines. 4,072,741, Cl. 424-325.000.

Huppertz, Josef: *See—*
Kuhling, Dieter; Huppertz, Josef; Krings, Peter; and Reuter, Herbert, 4,072,622, Cl. 252-179.000.

Hurd, Claude Calvert: *See—*
Munson, Ramon Jon; Hurd, Claude Calvert; and Weigl, James, 4,072,148, Cl. 128-142.200.

Hurst, Jonn S.: *See—*
Knight, Charles E., Jr.; Kovach, Louis; and Hurst, Jonn S., 4,072,084, Cl. 90-11.00A.

Huskins, Chester W., to United States of America, Army. Tri-functional isocyanate crosslinking agents for hydroxy-terminated polybutadiene binders. 4,072,702, Cl. 260-453.0AB.

Huston, Harold: *See—*
Coyle, John D., 4,072,511, Cl. 75-130.00R.

Hutter, Charles G., III, to Physical Systems, Inc. Removable door-locking device. 4,072,333, Cl. 292-292.000.

Huwyler, Franco, to Fabbrica Italiana Magneti Marelli S.p.A. Apparatus for determining the angular position of a rotating member using reference and position elements that generate opposite polarity bipolar signals. 4,072,893, Cl. 324-208.000.

Hylton, Thomas A.; and Shenton, Francis L., to Upjohn Company, The. Resolution of aminonitriles. 4,072,698, Cl. 260-465.00E.

Hynkova, Vlasta: *See—*
Hrabak, Frantisek; Bezdek, Milan; Hynkova, Vlasta; and Bouchal, Karel, 4,072,805, Cl. 526-43.000.

I-T-E Imperial Corporation: *See—*
Kussy, Frank W., 4,072,916, Cl. 335-16.000.

Ichikawa, Takehiko: *See—*
Togo, Kazushi; Tamura, Fumihide; Yasuda, Naohiko; Ichikawa, Takehiko; Sano, Konosuke; Matsuda, Keizo; and Mitsugi, Koji, 4,072,687, Cl. 260-306.70T.

ICI Americas Inc.: *See—*
Hartmann, Ludwig A., 4,072,656, Cl. 260-47.0EN.
Kruse, Walter M.; and Wright, Leon W., 4,072,628, Cl. 252-415.000.

Idel, Vladimir Viktorovich. Band saw teeth working machine. 4,072,068, Cl. 76-58.000.

Idstein, Hermann, to Hoechst Aktiengesellschaft. Sheet feed apparatus. 4,072,306, Cl. 271-3.000.

Ignatov, Viktor Alexandrovich: *See—*
Zorev, Nikolai Nikolaevich; Astafiev, Anatoly Alexandrovich; Loboda, Alexandr Sergeevich; Savukov, Vladimir Pavlovich; Runov, Andrei Efimovich; Belov, Vladimir Alexandrovich; Sobolev, Jury Vasilievich; Sobolev, Valentin Vasilievich; Pavlov, Nikolai Mikhailovich; Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Balandin, Jury Fedorovich; Gorynin, Igor Vasilievich; Zvezdin, Jury Ivanovich; Ivanov, Kuzma Makeevich; Ignatov, Viktor Alexandrovich; and Emelyanenko, July Georgievich, 4,072,509, Cl. 75-124.000.

Iguchi, Masayuki: *See—*
Kinoshita, Yoshio; and Iguchi, Masayuki, 4,072,223, Cl. 194-54.000.

Iizuka, Chiyokichi; and Takeuchi, Masaru. Method of artificially growing edible fungi. 4,071,973, Cl. 47-1.100.

Ikeda, Tadashi: *See—*
Yokobayashi, Koji; Ikeda, Tadashi; and Misaki, Akira, 4,072,567, Cl. 195-63.000.

Ikezaki, Muneyoshi; Ito, Nobuo; Okazaki, Yasushi; Hoshiyama, Masao; Nagao, Taku; and Nakajima, Hiromichi, to Tanabe Seiyaku Co., Ltd. Novel benzylalcohol derivatives as antidiabetics and cardiotonics. 4,072,759, Cl. 424-330.000.

Ilinkov, Dmitry Vladimirovich: *See—*
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.

Illig, Edwin J., to Corning Glass Works. Apparatus and process for producing a gradient photochromic ophthalmic lens. 4,072,490, Cl. 65-30.00R.

Illinois Tool Works Inc.: *See—*
Baer, Martin Alfred, 4,071,918, Cl. 10-10.00R.
Curtis, Gary Martin; and Wagner, David Prugh, 4,072,081, Cl. 85-62.000.

Imai, Hirosuke: *See—*
Ito, Hiroyuki; and Imai, Hirosuke, 4,072,646, Cl. 260-29.70H.

Imbert, Thierry F.: *See—*
Fauran, Claude P.; Turin, Michel J.; Imbert, Thierry F.; Raynaud, Guy M.; and Dorme, Nicole A. M., 4,072,682, Cl. 260-268.0BC.

IMC Chemical Group, Inc.: *See—*
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IMI (TAMI) Institut for Research and Development: *See—*
Ravey, Mani; Shorr, Leonard Marshall; and Waterman, Jacques A., deceased, 4,072,806, Cl. 526-89.000.

Imler, Vaughn R., to PPG Industries, Inc. Method and apparatus for reshaping glass sheets. 4,072,493, Cl. 65-107.000.

Imperial Chemical Industries Limited: *See—*
Darragh, John Irvine, 4,072,684, Cl. 260-290.00P.
Goodhart, Rupert Richard Francis Gerard Heron, 4,072,208, Cl. 181-401.000.
Pinto, Alwyn, 4,072,625, Cl. 252-373.000.

Imperial-Eastman (UK) Limited: *See—*
Smith, John Lionel, 4,071,936, Cl. 29-237.000.

Imperial Oil Limited: *See—*
Kizior, Thaddeus Eugene, 4,072,609, Cl. 210-73.00R.

Ing. C. Olivetti & C., S.p.A.: *See—*
Carena, Ugo, 4,072,833, Cl. 200-5.00R.

Ingersoll-Rand Company: *See—*
Friend, Lindsay Carlton, 4,072,176, Cl. 140-93.00R.
Ingerthorpe Holdings Limited: *See—*
Gow, James Gordon; and England, Alan Gordon, 4,072,610, Cl. 210-90.000.
Inoue, Kazuya; and Katano, Yukio, to Kabushiki-Kaisha K I P. Apparatus of generating control signals for controlling an operation of an electrophotographic copying machine. 4,072,415, Cl. 355-14.000.
Inoue, Takehisa; Ogawa, Yutaka; Sugita, Hiroaki; and Watanabe, Namio, to Akebono Brake Industry Co., Ltd. Discs brake of floating caliper type. 4,072,217, Cl. 188-73.600.
Inouye, Kozo; Yokota, Yukio; and Nakazyo, Kiyoshi, to Fuji Photo Film Co., Ltd. Silver halide photographic material containing two-equivalent color coupler. 4,072,525, Cl. 96-55.000.
Institut de Recherches de la Siderurgie Francaise Irsid: *See—*
Boillot, Pierre Gerard, 4,072,814, Cl. 13-20.000.
Institut Francais du Petrole: *See—*
Sarda, Jean-Paul; and Le Tirant, Pierre, 4,072,193, Cl. 166-280.000.
Institute for Cancer Research, The: *See—*
Loeb, Lawrence A.; and Sirover, Michael A., 4,072,574, Cl. 195-103.50R.
Instituto Venezolano de Investigaciones Cientificas: *See—*
Sosa, Jose M., 4,072,640, Cl. 260-17.4GC.
Institutul de Cercetari si Proiectari Pentru Utilaje de Constructii de Drumuri(I.C.P.U.C.) Braila: *See—*
Daschievici, Stefan; and Ferat, Cezar, 4,072,009, Cl. 60-484.000.
Instone, John C., to SGL Industries, Inc. Mounting arrangement for cased electrical components. 4,072,401, Cl. 339-125.00R.
Instrument Systems Corporation: *See—*
Joscelyn, Edwin, 4,072,831, Cl. 179-188.000.
Instrumentation Specialties Company: *See—*
Lederer, Louis Franklin, 4,072,052, Cl. 73-215.000.
Instruments S.A.: *See—*
Boillot, Pierre Gerard, 4,072,814, Cl. 13-20.000.
Intellectual Property Development Corporation: *See—*
Saltzman, William H., 4,072,695, Cl. 260-397.100.
Interatom, Internationale Atomreaktorbau GmbH: *See—*
Friedrich, Hans-Jurgen, 4,072,561, Cl. 176-38.000.
Interdyne Company: *See—*
Lewis, Richard A., 4,072,279, Cl. 242-192.000.
Lewis, Richard A., 4,072,280, Cl. 242-195.000.
International Business Machines Corporation: *See—*
Bechtle, Bastian; Schuenemann, Claus; Skudelny, Gisbert; Spruth, Wilhelm; Weis, Helmut; and Zimmermann, Volker, 4,072,888, Cl. 318-685.000.
Case, William John Philip; and Commander, Robert Duncan, 4,072,990, Cl. 360-77.000.
De La Moneda, Francisco H., 4,072,545, Cl. 148-187.000.
De La Moneda, Francisco H.; and Kotecha, Harish N., 4,072,868, Cl. 307-214.000.
Garcia, Joe La; Griffing, Brandt Mead; Hu, Paul Yu-Fei; and Millington, Richard George, 4,072,101, Cl. 101-93.150.
Gedney, Ronald Walker; and Rasile, John, 4,072,816, Cl. 174-52.0FP.
Heller, Lawrence Griffith; and Terman, Lewis Madison, 4,072,939, Cl. 340-347.0AD.
Manning, Donald Franklin; and Ryan, Robert Allan, 4,072,225, Cl. 197-133.00R.
von Gutfeld, Robert Jacob, 4,072,864, Cl. 250-338.000.
International Harvester Company: *See—*
Morling, Roy W.; Mackert, Robert J.; and Kesl, Elmer M., 4,072,062, Cl. 74-243.00R.
Phillips, Carmen S., 4,072,096, Cl. 100-53.000.
International Power Technology, Inc.: *See—*
Cheng, Dah Yu, 4,072,182, Cl. 165-1.000.
International Telephone & Telegraph Corporation: *See—*
Sumption, Richard F.; and Wallace, Charles H., 4,071,957, Cl. 33-174.00L.
Internationale Octrooi Maatschappij "Octropa" B.V.: *See—*
van der Linde, Robert; Meijerink, Gerardus Franciscus; and Rietberg, Johan, 4,072,662, Cl. 260-75.00R.
Intertack Anstalt: *See—*
Livio, Knut M. A., 4,072,261, Cl. 227-130.000.
Intertec Associates, Inc.: *See—*
Conant, Louis A.; Bolton, Wilbur Monroe; and Wilson, James Ellsworth, 4,072,243, Cl. 215-12.00R.
Inubushi, Masanobu; Yamamoto, Hajime; and Nagata, Osamu, to Kawasaki Jukogyo Kabushiki Kaisha. Chemical reaction furnace system. 4,072,006, Cl. 60-39.250.
Ipri, Alfred Charles, to RCA Corporation. Silicon resistive device for integrated circuits. 4,072,974, Cl. 357-23.000
IRL Daffin Associates, Inc.: *See—*
Coho, Ralph W.; Kugle, John L.; and Futty, Robert C., 4,072,435, Cl. 404-110.000.
Irrigation Engineering & Specialties: *See—*
Voss, Hubert E.; and Roth, Ronald W., 4,072,271, Cl. 239-541.000.
Irwin, Gordon A., to Steiger Tractor Inc. Air conditioning apparatus for tractor cab. 4,072,487, Cl. 62-244.000.
Isaeva, Elena Pavlovna: *See—*
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.
Isaia, Robert L., to Caterpillar Tractor Co. Door latch having overcenter spring. 4,072,332, Cl. 292-228.000.
Ishida, Masahiko; Oguri, Yoshitaka; Shimizu, Norio; and Muroi, Tadashi, to Hitachi, Ltd. Process for recovering microbial cellular proteins. 4,072,667, Cl. 260-112.00R.
Ishikawa, Katsuhiko: *See—*
Muto, Kiyoshi; Hisada, Toshihiko; Ohmori, Nobutsugu; Bessho, Satoshi; Mori, Naoharu; and Ishikawa, Katsuhiko, 4,071,996, Cl. 52-741.000.
Ishikawa, Katsuji: *See—*
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Ishikawa, Kazuo: *See—*
Hirata, Noritsugu; Takigawa, Tomoshi; and Ishikawa, Kazuo, 4,072,409, Cl. 352-174.000.
Ishitani, Akiyasu, to Sony Corporation. Insulated gate field effect transistor. 4,072,975, Cl. 357-23.000.
Israels, Sylvan H.: *See—*
Lewis, William; Weldon, Peter J.; Hagedorn, Henry, Jr.; Hayes, Thomas E.; and Israels, Sylvan H., 4,072,108, Cl. 102-70.20R.
Ito, Hiroshi: *See—*
Kimura, Yoshiaki; and Ito, Hiroshi, 4,072,423, Cl. 356-109.000.
Ito, Hiroyuki; and Imai, Hirosuke, to Nippon Oil Company Limited. Conjugated diene-maleic acid derivative compositions and process for preparing the same. 4,072,646, Cl. 260-29.70H.
Ito, Nobuo: *See—*
Ikezaki, Muneyoshi; Ito, Nobuo; Okazaki, Yasushi; Hoshiyama, Masao; Nagao, Taku; and Nakajima, Hiromichi, 4,072,759, Cl. 424-330.000.
Itoh, Takeshi: *See—*
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ITT Industries, Incorporated: *See—*
Burgdorf, Jochen; Eikenberg, Dieter; Stoka, Roberto; and Marianu, Vlod, 4,072,215, Cl. 188-72.400.
Hahm, Heinz Guenter; and Neef, Klaus, 4,072,219, Cl. 188-218.0XL.
Ivanov, Kuzma Makeevich: *See—*
Zorev, Nikolai Nikolaevich; Astafiev, Anatoly Alexandrovich; Loboda, Alexandr Sergeevich; Savukov, Vladimir Pavlovich; Runov, Andrei Efimovich; Belov, Vladimir Alexandrovich; Sobolev, Jury Vasilievich; Sobolev, Valentin Vasilievich; Pavlov, Nikolai Mikhailovich; Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Balandin, Jury Fedorovich; Gorynin, Igor Vasilievich; Zvezdin, Jury Ivanovich; Ivanov, Kuzma Makeevich; Ignatov, Viktor Alexandrovich; and Emelyanenko, July Georgievich, 4,072,509, Cl. 75-124.000.
Iwasaki, Minoru: *See—*
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Andow, Fumio; Matsushima, Tetsuo; and Iwasaki, Minoru, 4,073,009, Cl. 364-602.000.
Iwata, Hiroshi; and Ishikawa, Katsuji, to West Electric Co., Ltd. Programme-controlled shutter. 4,072,963, Cl. 354-31.000.
Iwatsu Electric Company, Ltd.: *See—*
Kokaji, Norio; and Urano, Toshihiro, 4,072,957, Cl. 346-74.100.
Izawa, Hiromi: *See—*
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Izon Corporation: *See—*
Waly, Adnan, 4,072,416, Cl. 355-46.000.
J. M. Voith GmbH: *See—*
Schiel, Christian, 4,072,557, Cl. 162-111.000.
J. P. Suggins Mobile Welding: *See—*
Hulligan, Jeffrey A., 4,071,991, Cl. 52-204.000.
J. Uriach y Cia. S.A.: *See—*
Marin Moga, Antonio Carmelo, 4,072,758, Cl. 424-321.000.
Jabsen, Felix S., to Babcock & Wilcox Company, The. Motion restraining apparatus for a nuclear reactor. 4,072,564, Cl. 176-76.000.
Jagenberg-Werke AG: *See—*
Buschmann, Gerhard; and Spohr, Reinhard, 4,072,887, Cl. 318-675.000.
Jaham Mfg. Co., Inc.: *See—*
Hamilton, James T., 4,072,059, Cl. 73-423.00R.
Jahn, Alex K., to Dow Badische Company. Finish for acrylic fiber. 4,072,617, Cl. 252-8.900.
James, Forrest T.; and Guy, Stephen L., to Burlington Industries, Inc. Method for applying a foam backing to fabric. 4,072,775, Cl. 427-373.000.
James Hardie & Coy. Pty. Limited: *See—*
Gazzard, Warwick Henry; and Kearin, Roger Michael, 4,072,460, Cl. 425-471.000.
James, Henry: *See—*
Johnson, Carl B.; and James, Henry, 4,072,342, Cl. 297-84.000.
James Perris Co., Inc., The: *See—*
Perris, James, 4,072,268, Cl. 236-78.00C.
Janelid, Erik Ingvar. Method for mining of rock or ore according to the block caving principle in massive formations. 4,072,352, Cl. 299-19.000.
Janssen, Frank J., to Shell Oil Company. Regeneration of alkene disproportionation catalyst. 4,072,629, Cl. 252-416.000.
Japan Atomic Energy Research Institute: *See—*
Araki, Kunio; Sasaki, Takashi; Kasahara, Yuko; Yamashita, Yoshisada; Yotumoto, Keiichi; Sunaga, Hiromi; Tabei, Kiyoshi;

Goto, Kazuo; Tajiri, Kunio; and Kittaka, Hirokama, 4,072,792, Cl. 428-246.000.
Jayawant, Bhalchandra Vinayak, to University of Sussex, The. Electromagnetic suspension assembly. 4,072,110, Cl. 104-148.0MS.
Jen-Shuy, Ren. Automatic noodle machine. 4,072,454, Cl. 425-101.000.
Jeram, Edward M., to General Electric Company. Organosiloxane gels. 4,072,635, Cl. 260-2.50S.
Jeumont-Schneider: *See—*
Wiart, Albert Charles; and de la Jonquiere, Pierre Jacques, 4,072,882, Cl. 318-227.000.
JGC Corporation: *See—*
Aoki, Makoto; and Nishiyama, Tadao, 4,072,482, Cl. 55-195.000.
Johnson, Ben C.; Thornton, J. Scott; Glowe, Donald E.; Cassidy, Patrick E.; and Anderson, Robert E., to Thermon Manufacturing Company. Electrical heating cable with temperature self-limiting heating elements. 4,072,848, Cl. 219-528.000.
Johnson, Carl B.; and James, Henry, to Pontiac Furniture Industries, Inc. Recliner chair. 4,072,342, Cl. 297-84.000.
Johnson, Henry Charles, to RCA Corporation. Monotonically ranging FM-CW radar signal processor. 4,072,947, Cl. 343-14.000.
Johnson, Joe, Jr., to Coats & Clark Inc. Noise reducing inserts for spindle tape idlers. 4,072,367, Cl. 308-18.000.
Johnston, William C., to Kysor Industrial Corporation. Air defrost reach-in refrigerated display cabinet. 4,072,488, Cl. 62-282.000.
Jones, Edward Stephen: *See—*
Nychka, Henry Robert; Eibeck, Richard Elmer; Robinson, Martin Alvin; and Jones, Edward Stephen, 4,072,726, Cl. 260-633.000.
Jones, Eric, to English Electric Valve Co., Ltd. Combustible gas detectors. 4,072,467, Cl. 23-254.00E.
Jones, Richard S. Signaling device for mailboxes. 4,072,265, Cl. 232-35.000.
Joscelyn, Edwin, to Instrument Systems Corporation. Voice transmitting apparatus for a breathing mask. 4,072,831, Cl. 179-188.000.
Joseph, Ruth. See-through, smoked gray, plexiglass refrigerator door. 4,072,486, Cl. 62-131.000.
Joyce, Ronald S.: *See—*
Sinha, Rabindra Kumar; Wagner, Norman J.; and Joyce, Ronald S., 4,072,479, Cl. 55-73.000.
Joyner, Frederick B.: *See—*
McConnell, Richard L.; Weemes, Doyle A.; and Joyner, Frederick B., 4,072,812, Cl. 526-348.200.
McConnell, Richard L.; Weemes, Doyle A.; and Joyner, Frederick B., 4,072,813, Cl. 526-348.200.
Judin, Vladimir Vasilievich: *See—*
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Julius, Robert P., to Nice-Pak Products, Inc. Highly absorbent sponge. 4,071,955, Cl. 32-34.000.
Junghans, Rudi; and Beisel, Hermann, to Heidelberger Druckmaschinen AG. Washing device for cleaning the blanket cylinder of an offset printing press. 4,072,106, Cl. 101-425.000.
Jury, Daniel E., to Raymond Lee Organization, Inc., The, a part interest. Disposable grease absorbing mill. 4,071,921, Cl. 15-227.000.
K & F Manufacturing Co., Inc.: *See—*
Wright, Theodore D., 4,072,920, Cl. 335-285.000.
Kabat, John L., to Honeywell Inc. Proportional temperature control system incorporating a linear delay. 4,072,866, Cl. 307-41.000.
Kabel-und Metallwerke: *See—*
Ziemek, Gerhard; and Schatz, Friedrich, 4,072,035, Cl. 72-209.000.
Kabushiki Kaisha Daini Seikosha: *See—*
Tanaka, Kojiro; and Yagi, Kenjiro, 4,072,004, Cl. 58-23.00R.
Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo: *See—*
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Kabushiki Kaisha Mitachi Onkyo Seisakusho: *See—*
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Kabushiki Kaisha Tokyo Kikai Seisakusho: *See—*
Kitai, Mitsuo; and Yamashita, Koichi, 4,072,060, Cl. 73-423.00R.
Kaden, Walter Erich. Diaphragm operated float controlled valve. 4,072,164, Cl. 137-414.000.
Kaganowicz, Grzegorz; and Robinson, John Walter, to RCA Corporation. Video disc with a dielectric layer formed from styrene and nitrogen. 4,072,985, Cl. 358-128.000.
Kahn, Benjamin. Tennis racquet handle constructions. 4,072,312, Cl. 273-75.000.
Kaiser, Arthur, to Thomson-CSF Laboratories, Inc. Chrominance-luminance separator. 4,072,984, Cl. 358-31.000.
Kaiser, Georges J., to Fabrique Nationale Herstal S.A. Axial piston pumps. 4,072,444, Cl. 417-269.000.
Kaiser, Victor: *See—*
Becdelievre, Charles; Kaiser, Victor; and Paradowski, Henri, 4,072,485, Cl. 62-23.000.
Kajima Kensetsu Kabushiki Kaisha: *See—*
Muto, Kiyoshi; Hisada, Toshihiko; Ohmori, Nobutsugu; Bessho, Satoshi; Mori, Naoharu; and Ishikawa, Katsuhiko, 4,071,996, Cl. 52-741.000.
Kallrath, Gottfried: *See—*
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Kaloi, Cyril M., to United States of America, Navy. Notch fed twin electric micro-strip dipole antennas. 4,072,951, Cl. 343-700.0MS.
Kaltenbach & Voigt: *See—*
Eibofner, Eugen, 4,071,954, Cl. 32-27.000.
Kamaike, Hiroshi: *See—*
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Kaminaka, Nobuyuki: *See—*
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Kammlott, Guenther Wilhelm: *See—*
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Kanai, Kenji: *See—*
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Kanebo, Ltd.: *See—*
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Kanno, Yoshimitsu: *See—*
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Kovanov, Pavel Vasilievich; Torochkov, Ivan Mikhailovich; Zonenko, Ivan Timofeevich; Alexandrov, Adolf Moritsovich; Aglitsky, Vladimir Efimovich; Tsimbler, Jury Abramovich; Kantor, Ilya Solomonovich; Topolyansky, Jury Arnoldovich; and Lurie, Mikhail Vladimirovich, 4,072,109, Cl. 104-138.00R.
Kao Soap Co., Ltd.: *See—*
Sekine, Hisashi; Yamamoto, Akira; and Hayashi, Shizuo, 4,072,697, Cl. 260-397.250.
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Karasudani, Yasuo: *See—*
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Karataev, Valery Ivanovich: *See—*
Mamyrin, Boris Alexandrovich; Karataev, Valery Ivanovich; and Shmikk, Dmitry Viktorovich, 4,072,862, Cl. 250-286.000.
Karatsjuba, Anatoly Prokofievich; Kmita, Tatyana Georgievna; Kruglov, Igor Ivanovich; Kurinny, Vladimir Ivanovich; Kurnosov, Anatoly Ivanovich; Ryzhikov, Igor Veniaminovich; and Judin, Vladimir Vasilievich. Method for manufacturing a semiconductor display device. 4,071,945, Cl. 29-578.000.
Karrer, Friedrich: *See—*
Farooq, Saleem; Drabek, Jozef; Gsell, Laurenz; Karrer, Friedrich; and Meyer, Willy, 4,072,752, Cl. 424-304.000.
Kasahara, Yuko: *See—*
Araki, Kunio; Sasaki, Takashi; Kasahara, Yuko; Yamashita, Yoshisada; Yotumoto, Keiichi; Sunaga, Hiromi; Tabei, Kiyoshi; Goto, Kazuo; Tajiri, Kunio; and Kittaka, Hirokama, 4,072,792, Cl. 428-246.000.
Kaspar, Gunther: *See—*
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Katano, Yukio: *See—*
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Katsumata, Masaaki; and Fujiki, Norio, to Nissan Motor Company, Limited. Radar-operated collision avoidance system for roadway vehicles using stored information for determination of valid objects. 4,072,945, Cl. 343-7.0VM.
Katsuo, Kenichi: *See—*
Konomi, Tuyoshi; Endo, Seiji; Yamaguchi, Masayasu; and Katsuo, Kenichi, 4,072,664, Cl. 260-78.00R.
Kaukeinen, Joseph Yorks: *See—*
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Kawakami, Susumu, to Toyota Jidosha Kogyo Kabushiki Kaisha. Dual-system master cylinder. 4,072,012, Cl. 60-562.000.
Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Inubushi, Masanobu; Yamamoto, Hajime; and Nagata, Osamu, 4,072,006, Cl. 60-39.250.
Kawasaki Steel Corporation: *See—*
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Kayser, Detlev: *See—*
Schacht, Erich; Mehrhof, Werner; Simane, Zdenek; Nowak, Herbert; and Kayser, Detlev, 4,072,754, Cl. 424-308.000.
Kearin, Roger Michael: *See—*
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Keelty, James Malcolm, to RCA Corporation. Wide acquisition range MSK demodulator input circuit. 4,072,905, Cl. 329-122.000.
Kehoe, Lawrence J.: *See—*
Hargis, Duane C.; and Kehoe, Lawrence J., 4,072,732, Cl. 260-682.000.
Hargis, Duane C.; and Kehoe, Lawrence J.; 4,072,733, Cl. 260-682.000.
Kemp, Willard E., to ACF Industries, Incorporated. Visual indicator for safety systems. 4,072,126, Cl. 116-125.000.
Kennecott Copper Corporation: *See—*
Godrick, Joseph A.; and Sliney, Joseph Leo, 4,072,262, Cl. 228-265.000.
Kent, David W. Security apparatus for vehicle communications accessory. 4,072,031, Cl. 70-58.000.
Kenworthy, Milton James; and Woltmann, Ivan Elmer, to General Electric Company. Variable area bypass injector system. 4,072,008, Cl. 60-261.000.

Kepic, Stefan: *See—*
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Kergueno, Joseph: *See—*
Fillios, Jean-Pierre; and Kergueno, Joseph, 4,072,141, Cl. 126-270.000.

Kersting, Arno: *See—*
Niemann, Hans-Joachim; Schuster, Eberhard; and Kersting, Arno, 4,072,590, Cl. 204-157.10R.

Kesl, Elmer M.: *See—*
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Khrennikova, Ljudmila Pavlovna: *See—*
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.

Kikumoto, Ryoji: *See—*
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,743, Cl. 424-177.000.
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuno; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,744, Cl. 424-177.000.
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,757, Cl. 424-267.000.

Kimberly Rose Company, Inc.: *See—*
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Kimura, Yoshiaki; and Ito, Hiroshi, to Konishiroku Photo Industry Co., Ltd. Light interference device with low degree of spacial coherence. 4,072,423, Cl. 356-109.000.

Kinoshita, Yoshio; and Iguchi, Masayuki, to Glory Kogyo Kabushiki Kaisha. Control system of coin-operated locker. 4,072,223, Cl. 194-54.000.

Kirschner, Fritz, to Siemens Aktiengesellschaft. Thyristor. 4,072,980, Cl. 357-38.000.

Kiselev, Vasily Pavlovich: *See—*
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.

Kitagawa, Norihisa; and White, Lionel Stuart, Jr., to Texas Instruments Incorporated. Clock generator for semiconductor memory. 4,072,932, Cl. 365-233.000.

Kitai, Mitsuo; and Yamashita, Koichi, to Kabushiki Kaisha Tokyo Kikai Seisakusho. Apparatus for sampling printed sheets from a continuous stream of such sheets. 4,072,060, Cl. 73-423.00R.

Kitajima, Tadayuki; and Tohyama, Yoshikuni, to Canon Kabushiki Kaisha. Driving device for a moving body. 4,072,211, Cl. 185-40.00R.

Kitamori, Teruaki: *See—*
Tsujihara, Toshio; Saito, Humitoshi; and Kitamori, Teruaki, 4,072,315, Cl. 274-1.00E.

Kitamoto, Tatsuji: *See—*
Shirahata, Ryuji; Suzuki, Masaaki; and Kitamoto, Tatsuji, 4,072,781, Cl. 428-336.000.

Kitao, Yoshinobu: *See—*
Murakado, Hiroshi; Nakata, Kazuhiro; Usui, Eiki; Tamiya, Tetsuo; Chikuda, Masahiro; Kitao, Yoshinobu; and Fujiwara, Akira, 4,072,542, Cl. 148-11.50A.

Kittaka, Hirokama: *See—*
Araki, Kunio; Sasaki, Takashi; Kasahara, Yuko; Yamashita, Yoshisada; Yotumoto, Keiichi; Sunaga, Hiromi; Tabei, Kiyoshi; Goto, Kazuo; Tajiri, Kunio; and Kittaka, Hirokama, 4,072,792, Cl. 428-246.000.

Kizior, Thaddeus Eugene, to Canada, Her Majesty the Queen in right of, as represented by the Minister of Energy, Mines and Resources; Her Majesty the Queen in right of the Province of Alberta, Government of the Province of Alberta, Department of Energy and Natural Resources, Alberta Syncrude Equity; Ontario Energy Corporation; Imperial Oil Limited; Canada-Cities Service, Ltd.; and Gulf Oil Canada Limited. Capacitance system for heavy phase discharge of second stage centrifugal separation circuit. 4,072,609, Cl. 210-73.00R.

Klauke, Erich: *See—*
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, 4,072,500, Cl. 71-98.000.

Kleeberg, Wolfgang; Rubner, Roland; and Bartel, Wieland, to Siemens Aktiengesellschaft. Mixtures yielding thermally stable photo-cross-linkable layers and foils. 4,072,524, Cl. 96-35.100.

Kleeberg, Wolfgang; Hacker, Heinz; and Hauschildt, Klaus-Robert, to Siemens Aktiengesellschaft. Cross-linkable epoxy resin casting compounds. 4,072,804, Cl. 526-11.200.

Kleiner, Hans-Jerg: *See—*
Linke, Fritz; Dursch, Walter; and Kleiner, Hans-Jerg, 4,072,776, Cl. 427-390.00D.

Kleinschmidt, Heinz: *See—*
Heiser, Joachim; Hoheisel, Rainer; Flaschar, Heinz; Gand, Heinz; Kleinschmidt, Heinz; Braunlinger, Konrad; Sopha, Klaus; Schempp, Roland; and Sanzenbacher, Hermann, 4,072,169, Cl. 137-596.130.

Klett, Gene R., to Caterpillar Tractor Co. Quick change corner tooth assembly for loader buckets. 4,071,967, Cl. 37-141.00T.

Kline, Richard H., to Goodyear Tire & Rubber Company, The. 3-(4-Anilinophenoxy)-2-hydroxypropyl sulfides, ethers and amines as antioxidants. 4,072,654, Cl. 260-45.9QB.

Kluy, Werner: *See—*
Feichtinger, Hans; Lutze, Siegfried; Birnkraut, Hans-Walter; and Kluy, Werner, 4,072,659, Cl. 260-57.00A.

Kmita, Tatyana Georgievna: *See—*
Karatsjuba, Anatoly Prokofievich; Kmita, Tatyana Georgievna; Kruglov, Igor Ivanovich; Kurinny, Vladimir Ivanovich; Kurnosov, Anatoly Ivanovich; Ryzhikov, Igor Veniaminovich; and Judin, Vladimir Vasilievich, 4,071,945, Cl. 29-578.000.

Kneefel, Wim Bernard Samuel Maria. Method and apparatus for measuring the distance between two stations. 4,072,946, Cl. 343-12.00R.

Knieser, James J., to Xerox Corporation. Corner sheet stripper. 4,072,307, Cl. 271-174.000.

Knight, Charles E., Jr.; Kovach, Louis; and Hurst, Jonn S., to United States of America, Energy. Graphite fiber reinforced structure for supporting machine tools. 4,072,084, Cl. 90-11.00A.

Knox, Kenneth Leith; and Lees, Joseph Kolb, to Du Pont de Nemours, E. I., and Company. Polyethylene terephthalate film. 4,072,779, Cl. 428-220.000.

Knox Manufacturing Co.: *See—*
Brown, Donald J., 4,072,404, Cl. 350-117.000.

Knox, Robert M.; and Toulios, Peter P., to Epsilon Lambda Electronics Corporation. Receiver module and mixer thereof. 4,072,902, Cl. 325-446.000.

Kobe Steel, Ltd.: *See—*
Murakado, Hiroshi; Nakata, Kazuhiro; Usui, Eiki; Tamiya, Tetsuo; Chikuda, Masahiro; Kitao, Yoshinobu; and Fujiwara, Akira, 4,072,542, Cl. 148-11.50A.

Koch, Ronney R.: *See—*
Cole, Robert Clay; Koch, Ronney R.; and Ramos, Joseph, 4,072,194, Cl. 166-295.000.

Koehler, Wolfgang: *See—*
Diehl, Walter; and Koehler, Wolfgang, 4,072,593, Cl. 204-192.00F.

Kohli, Martti Ilmari; Eklund, Fjalar Ernst Erik; and Callerhorn, Bo Allan, to Concordia Development AB. Method of and an apparatus for preparing a food product. 4,072,092, Cl. 99-389.000.

Kohno, Yoshiki: *See—*
Masunaga, Midori; Kohno, Yoshiki; and Hasegawa, Hiroshi, 4,072,620, Cl. 252-63.000.

Kok, Cornelis Hendrik, to U.S. Philips Corporation. Automatic magnetic-tape cassette changing device. 4,072,991, Cl. 360-92.000.

Kokaji, Norio; and Urano, Toshihiro, to Iwatsu Electric Company, Ltd. Non-impact printing system with magnetic recording apparatus and method. 4,072,957, Cl. 346-74.100.

Kokubo, Toshihiro, to Diesel Kiki Co., Ltd. Automotive speed control device. 4,072,207, Cl. 180-108.000.

Koleff, Boris; and Hofmann, Wilfried, to AGFA-Gevaert Aktiengesellschaft. Apparatus for optical scanning of microfilms or the like. 4,072,860, Cl. 250-216.000.

Kollmorgen Technologies Corporation: *See—*
Arnold, Frank, Jr., 4,072,874, Cl. 310-268.000.

Kondo, Takashi: *See—*
Oshima, Takeo; and Kondo, Takashi, 4,072,854, Cl. 235-92.0SB.

Kondo, Toshihiro, to Fuji Photo Film Co., Ltd. Electronic shutter control circuit. 4,072,965, Cl. 354-51.000.

Kondo, Toshiyuki, to Aisin Seiki Kabushiki Kaisha. Anti-skid control apparatus. 4,072,366, Cl. 303-116.000.

Konishiroku Photo Industry Co., Ltd.: *See—*
Kimura, Yoshiaki; and Ito, Hiroshi, 4,072,423, Cl. 356-109.000.

Konomi, Tuyoshi; Endo, Seiji; Yamaguchi, Masayasu; and Katsuo, Kenichi, to Toyobo Co., Ltd. Aromatic polyamides from N,N'-bis(p-aminobenzoyl)ethylene diamine. 4,072,664, Cl. 260-78.00R.

Kopito, Louis, to Ovutime, Inc. Viscometer for indicating rheological properties of fluids having high and low viscosity components. 4,072,045, Cl. 73-54.000.

Kornis, Gabriel: *See—*
Moon, Malcolm W.; and Kornis, Gabriel, 4,072,498, Cl. 71-92.000.

Korrenn, Heinz; Teich, Wolfgang; and Heimrich, Helmut, to Kugelfischer Georg Schafer & Co. Heavy-duty swivel bearing. 4,072,372, Cl. 308-72.000.

Kostura, Michal; Pandula, Jan; Harmansky, Absolon; Smiga, Slavomir; and Kepic, Stefan, to Vihorlat, narodny podnik. Apparatus for regulating the temperature of a casting mold. 4,072,181, Cl. 164-154.000.

Kotecha, Harish N.: *See—*
De La Moneda, Francisco H.; and Kotecha, Harish N., 4,072,868, Cl. 307-214.000.

Kouno, Takashi: *See—*
Tanaka, Tadashi; Okamoto, Akira; Kouno, Takashi; Kramer, William E.; Hopkins, Richard H.; and Hoffman, Richard A., 4,072,657, Cl. 260-47.0UA.

Kovach, Louis: *See—*
Knight, Charles E., Jr.; Kovach, Louis; and Hurst, Jonn S., 4,072,084, Cl. 90-11.00A.

Kovanov, Pavel Vasilievich; Torochkov, Ivan Mikhailovich; Zonenko,

Ivan Timofeevich; Alexandrov, Adolf Moritsovich; Aglitsky, Vladimir Efimovich; Tsimbler, Jury Abramovich; Kantor, Ilya Solomonovich; Topolyansky, Jury Arnoldovich; and Lurie, Mikhail Vladimirovich. Pneumatically conveyed container with air tight sealing and guide means. 4,072,109, Cl. 104-138.00R.

Kowallik, Josef, to Hoesch Werke Aktiengesellschaft. Method of and device for inter-connecting individual profiled plates to be connected to each other end-to-end, and a structural connection effected thereby. 4,071,942, Cl. 29-469.500.

Kowalski, John L.: *See*—
Smith, Garland Y.; Scott, Gerald R.; Blazek, George A.; and Kowalski, John L., 4,072,437, Cl. 407-118.000.

Kraftco Corporation: *See*—
Loeb, Melvin L., 4,072,641, Cl. 260-18.00N.

Kraftwerk Union Aktiengesellschaft: *See*—
Niemann, Hans-Joachim; Schuster, Eberhard; and Kersting, Arno, 4,072,590, Cl. 204-157.10R.
Seidelberger, Emmerich, 4,072,560, Cl. 176-38.000.

Kramer, Heinz; Peretti, Norbert; and Waschneck, Helmut, to Owens-Illinois, Inc. Method for producing blown hollow glass objects. 4,072,491, Cl. 65-72.000.

Kramer, Karl; and Durst, Karlheinz, to Hoechst Aktiengesellschaft. Container with frangible piercing point. 4,072,233, Cl. 206-634.000.

Kramer, William E.; Hopkins, Richard H.; and Hoffman, Richard A., to Westinghouse Electric Corporation. Composite erosion resistant optical window. 4,072,782, Cl. 428-409.000.

Kramer, William E.: *See*—
Tanaka, Tadashi; Okamoto, Akira; Kouno, Takashi; Kramer, William E.; Hopkins, Richard H.; and Hoffman, Richard A., 4,072,657, Cl. 260-47.0UA.

Kranz, Berthold, to Carl Canzler, Firma. Method of cooling a quenching bath of melted salt. 4,072,298, Cl. 266-44.000.

Kranz, Richard, to Tension Envelope Corporation. Duplex mailing envelope. 4,072,264, Cl. 229-72.000.

Kratcoski, Frank L.; and Hausmann, Herbert H., to Oce'-Industries, Inc. Convertible input reader-printer. 4,072,410, Cl. 353-68.000.

Krechel, Henry H.: *See*—
Chuss, John T.; Krechel, Henry H.; and Purvis, Joseph R., 4,071,944, Cl. 29-574.000.

Krejsa, Richard E., to S & C Electric Company. Electrical interlock apparatus for electrical equipment. 4,073,000, Cl. 361-344.000.

Kremer, Charles J.: *See*—
Borchert, Alfred E.; and Kremer, Charles J., 4,072,634, Cl. 260-2.50A.

Krings, Peter: *See*—
Kuhling, Dieter; Huppertz, Josef; Krings, Peter; and Reuter, Herbert, 4,072,622, Cl. 252-179.000.

Kristiansen, Aksel Erik: *See*—
Pedersen, Thor; and Kristiansen, Aksel Erik, 4,072,250, Cl. 222-326.000.

Krolak, Ronald Francis: *See*—
Cameron, John Keith; and Krolak, Ronald Francis, 4,072,383, Cl. 339-59.00R.

Kronseder, Hermann: *See*—
Gau, Georg, 4,072,555, Cl. 156-571.000.

Kruglov, Igor Ivanovich: *See*—
Karatsjuba, Anatoly Prokofievich; Kmita, Tatyana Georgievna; Kruglov, Igor Ivanovich; Kurinny, Vladimir Ivanovich; Kurnosov, Anatoly Ivanovich; Ryzhikov, Igor Veniaminovich; and Judin, Vladimir Vasilievich, 4,071,945, Cl. 29-578.000.

Kruse, Walter M.; and Wright, Leon W., to ICI Americas Inc. Regeneration of supported ruthenium catalyst. 4,072,628, Cl. 252-415.000.

Kubens, Rolf, to Bayer Aktiengesellschaft. Process for the production of foundry cores and molds. 4,072,649, Cl. 260-37.00N.

Kubo, Shunichi: *See*—
Suda, Masashi; and Kubo, Shunichi, 4,072,412, Cl. 355-3.0TR.

Kubo, Yoshiki, to Toyo Kogyo Co., Ltd. Honing machine provided with a power controller. 4,071,980, Cl. 51-165.870.

Kuboshima, Makoto, to Fuji Photo Film Co., Ltd. Focus adjustment and determination means. 4,072,971, Cl. 354-201.000.

Kucharski, Leonard J.: *See*—
McConnell, Lorne D.; and Kucharski, Leonard J., 4,072,392, Cl. 339-258.00R.

Kucherenko, Anatoly Gavrilovich: *See*—
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.

Kuchuk, Ivan Anatolievich: *See*—
Volman, Mikhail Yakovlevich; Grinshtein, Vladimir Yakovlevich; Zhukov, Mikhail Leonidovich; Kuchuk, Ivan Anatolievich; and Polovinkin, Evgeny Petrovich, 4,072,999, Cl. 361-333.000.

Kudchadker, Mohan V.; and Weiss, Walter J., to Texaco Inc. Sulfomethylated lignite salt as a sacrifical agent in oil recovery processes. 4,072,192, Cl. 166-273.000.

Kuenzle, Paul; and Baumgartl, Ulrich, to Siemens Aktiengesellschaft. Control electrode for high-voltage apparatus. 4,072,832, Cl. 200-48.00R.

Kugelfischer Georg Schafer & Co.: *See*—
Korrenn, Heinz; Teich, Wolfgang; and Heimrich, Helmut, 4,072,372, Cl. 308-72.000.

Kugle, John L.: *See*—
Coho, Ralph W.; Kugle, John L.; and Futty, Robert C., 4,072,435, Cl. 404-110.000.

Kuhling, Dieter; Huppertz, Josef; Krings, Peter; and Reuter, Herbert, to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA). Stable aqueous suspension of water-insoluble, calcium-binding aluminosilicates and organic suspending agents. 4,072,622, Cl. 252-179.000.

Kuhn, Robert R.; and Machleder, Warren H., to Rohm and Haas Company. Motor fuel composition. 4,072,474, Cl. 44-58.000.

Kulson, Walter A., to Wit-Son Carbide Tool, Inc. Automatic loader. 4,072,476, Cl. 51-215.00H.

Kume, Masahiro: *See*—
Motoyoshi, Kenya; Kume, Masahiro; and Amano, Yoshinari, 4,072,515, Cl. 75-173.00A.

Kuraray Co., Ltd.: *See*—
Fukushima, Osamu, 4,072,773, Cl. 427-246.000.

Kurataro, Kuze. Water closet seat warmer and ventilator. 4,071,915, Cl. 4-217.000.

Kurihara, Norimitsu: *See*—
Yashima, Michio; Senzaki, Takaya; and Kurihara, Norimitsu, 4,072,925, Cl. 340-52.00F.

Kurinny, Vladimir Ivanovich: *See*—
Karatsjuba, Anatoly Prokofievich; Kmita, Tatyana Georgievna; Kruglov, Igor Ivanovich; Kurinny, Vladimir Ivanovich; Kurnosov, Anatoly Ivanovich; Ryzhikov, Igor Veniaminovich; and Judin, Vladimir Vasilievich, 4,071,945, Cl. 29-578.000.

Kurnosov, Anatoly Ivanovich: *See*—
Karatsjuba, Anatoly Prokofievich; Kmita, Tatyana Georgievna; Kruglov, Igor Ivanovich; Kurinny, Vladimir Ivanovich; Kurnosov, Anatoly Ivanovich; Ryzhikov, Igor Veniaminovich; and Judin, Vladimir Vasilievich, 4,071,945, Cl. 29-578.000.

Kuroda, Nobuyuki: *See*—
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, 4,072,722, Cl. 260-621.00G.

Kurosawa, Toyoki. Emergency valve incorporating thermal foamable plastic material. 4,072,159, Cl. 137-67.000.

Kurrle, Frederick L., to Westvaco Corporation. Composite silicate pigment. 4,072,537, Cl. 106-288.00B.

Kurtz, Donald R.: *See*—
Crouch, Donald W.; and Kurtz, Donald R., 4,072,837, Cl. 200-144.00B.

Kurz GmbH: *See*—
Kurz, Rudolf, 4,072,341, Cl. 297-27.000.

Kurz, Rudolf, to Kurz GmbH. Adjustable chair. 4,072,341, Cl. 297-27.000.

Kussy, Frank W., to I-T-E Imperial Corporation. Stacked circuit breakers having high interrupting capacity. 4,072,916, Cl. 335-16.000.

Kusumoto, Masahiko: *See*—
Tanaka, Kazunobu; Kusumoto, Masahiko; and Watanabe, Shoji, 4,071,975, Cl. 47-9.000.

Kysor Industrial Corporation: *See*—
Johnston, William C., 4,072,488, Cl. 62-282.000.

L. B. Holliday & Company Limited: *See*—
Vellins, Cyril Eric; and Dixon, Leonard Fox, 4,072,462, Cl. 8-2.50A.

L. K. Van Keuren Company, Inc.: *See*—
Mulligan, Vincent R., 4,072,230, Cl. 206-334.000.

Laboratoire Suisse de Recherches Horlogeres: *See*—
Gass, Hans; Hintermann, Hans Erich; and Griepentrog, Hartmut, 4,072,797, Cl. 428-409.000.

L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See*—
Thibault, Jean-Jacques, 4,072,025, Cl. 62-55.500.

Lakshmanan, Pallavoor R.; Swift, Harold E.; and Wu, Ching Yong, to Gulf Research & Development Company. Process for preparing elastomers for pressure-sensitive adhesive application. 4,072,808, Cl. 526-76.000.

Lamb, Robert Colin. Spacing system. 4,072,778, Cl. 428-52.000.

Lambert Brake Corporation: *See*—
Van Anrooy, John A., 4,072,362, Cl. 303-7.000.

Lambertus, Friedrich, to Werner & Pfleiderer. Nozzle for a granulating device for granulating synthetic plastics material. 4,072,459, Cl. 425-464.000.

Lammers, Peter C., to Goodyear Tire & Rubber Company, The. Method for making a flexible mold. 4,072,673, Cl. 264-225.000.

Land, Edwin H.; Bachelder, Albert J.; and Perry, Sarah H., to Polaroid Corporation. Self-retracting imbibition chamber for cameras and method of making the same. 4,072,968, Cl. 354-86.000.

Landstingens Inkopscentral: *See*—
Ekenstam, Bo Thuresson Af; and Nordqvist, Erik Gustaf Percy, 4,072,249, Cl. 222-95.000.

Langdon, William K., to BASF Wyandotte Corporation. Multi-block coupled polyoxyalkylene copolymer surfactants. 4,072,704, Cl. 260-463.000.

Lanham, James W.; Rodgers, Gregory D.; and Meyer, Michael C., to McDonnell Douglas Corporation. *E. coli* detection broth for clinical use with automated microbial analyzer. 4,072,572, Cl. 195-100.000.

Lanham, James W.; Wilkinson, Ralph A.; and Dagy, Victoria A., to McDonnell Douglas Corporation. Broth and method for detecting *E. coli* in mixed water samples. 4,072,575, Cl. 195-103.50M.

Lao, Binneg Yanbing, to Dow Chemical Company, The. Acoustic pycnometer. 4,072,046, Cl. 73-574.000.

LaPointe, Gabriel M., to Parker Manufacturing Company. Hole saw. 4,072,441, Cl. 408-204.000.

Large, George B.: *See—*
Pitt, Leland S.; and Large, George B., 4,072,745, Cl. 424-200.000.

Larrow, Kenneth. House assembly with prefabricated elements. 4,071,984, Cl. 52-79.100.

Larsen, Herbert; Zeidler, Guenter; and Schicketanz, Dieter, to Siemens Aktiengesellschaft. Communication cable. 4,072,398, Cl. 350-96.230.

Larson, Gerald L.; Pi, Alberto; and Uitvlugt, Martin W., to Eaton Corporation. Device for regulating vehicle road speed. 4,072,206, Cl. 180-105.00E.

Lasco Toys International Inc.: *See—*
Rosen, Beverly; and Tepper, Sidney A., 4,072,314, Cl. 273-161.000.

Laune, Pierre, to Eurolando. Baby carriage. 4,072,318, Cl. 280-42.000.

Laval, Claude C., Jr. Device for separating multiple phase fluid systems according to the relative specific gravities of the phase. 4,072,481, Cl. 55-177.000.

Lawrence, Dean M.; and Simpson, Fred E., to Caterpillar Tractor Co. Openable dual windshield arrangement for construction vehicles. 4,072,338, Cl. 296-28.00C.

Lawrence, John M.: *See—*
Radkowski, Stanley J.; Lawrence, John M.; Naggar, Enever; and Dunham, Raymond W., 4,072,473, Cl. 44-46.000.

Lawson, David Francis, to Firestone Tire & Rubber Company, The. Tetrametaphosphimic acid and derivatives as flame retardants. 4,072,651, Cl. 260-42.440.

Lear, Anthony: *See—*
Black, Christopher T.; and Lear, Anthony, 4,072,981, Cl. 357-46.000.

Leavitt, Richard Irwin, to Mobil Oil Corporation. Method for coagulating a colloidal suspension. 4,072,606, Cl. 210-51.000.

Le Borgne, Edmond: *See—*
Chaix, Jean Edmond; Fajeau, Maurice; Le Borgne, Edmond; and Zerouki, Aime, 4,072,189, Cl. 165-142.000.

Leder, Lewis B., to Xerox Corporation. Method of making trigonal selenium interlayers by glow discharge. 4,072,518, Cl. 96-1.50R.

Lederer, Louis Franklin, to Instrumentation Specialties Company. Flow proportioner. 4,072,052, Cl. 73-215.000.

Lee, Arnold St. Jacques, to Varian Associates, Inc. Fluid containment structure for transducer system. 4,072,056, Cl. 73-706.000.

Lee, Emil B., to Caterpillar Tractor Co. Pivoted ejector with hinged door for earthmoving scrapers. 4,071,965, Cl. 37-4.000.

Lee Pharmaceuticals: *See—*
Brattesani, Alan Joseph, 4,072,694, Cl. 260-340.90R.

Lees, Joseph Kolb: *See—*
Knox, Kenneth Leith; and Lees, Joseph Kolb, 4,072,779, Cl. 428-220.000.

Leeson, Jeffrey S.; and Szabo, Joseph F., to ESB Incorporated. Vent plug system for batteries. 4,072,799, Cl. 429-82.000.

Lehmann, Gunter: *See—*
Halbritter, Guenter; Muehlthaler, Wolfgang; Sperber, Heinrich; Diem, Hans; Dudeck, Christian; and Lehmann, Gunter, 4,072,717, Cl. 260-603.00C.

Lehnhoff, Terry F.: *See—*
Clark, George B.; and Lehnhoff, Terry F., 4,072,353, Cl. 299-22.000.

Leighton, Peter Watson; and Davidson, Charles Patrick Duncan, to Lucas Industries Limited. Cycle gear selector. 4,072,204, Cl. 180-34.000.

Lekarski, Simeon: *See—*
Gachot, Jean; and Lekarski, Simeon, 4,072,172, Cl. 137-624.200.

Lesher, George Y.; and Opalka, Chester J., Jr., to Sterling Drug Inc. 3-Amino-5-(pyridinyl)-2(1H)-pyridinones. 4,072,746, Cl. 424-263.000.

Leshik, Edward Alexander. Continuous loop tape cartridges. 4,072,992, Cl. 360-94.000.

Le Tirant, Pierre: *See—*
Sarda, Jean-Paul; and Le Tirant, Pierre, 4,072,193, Cl. 166-280.000.

Le Troadec, Yves: *See—*
Bellehache, Pierre; and Le Troadec, Yves, 4,072,162, Cl. 137-71.000.

Leuenberger, Hans Georg Wilhelm: *See—*
Boguth, Walter; Leuenberger, Hans Georg Wilhelm; Mayer, Hans Johann; Widmer, Erich; and Zell, Reinhard, 4,072,715, Cl. 260-586.00R.

Lever Brothers Company: *See—*
Murphy, John E.; and Wolf, Chester, 4,072,248, Cl. 222-56.000.
Reed, David Alan, 4,072,632, Cl. 252-541.000.

Levine, Faye E. Sanitary napkin. 4,072,151, Cl. 128-290.00R.

Levy, Paul M., to Capitol Hardware Manufacturing Company, Inc. Connector for tubular frame members. 4,072,432, Cl. 403-170.000.

Lewis, Claude I.: *See—*
Mc Geady, JaYong C.; and Lewis, Claude I., 4,072,155, Cl. 131-140.00P.

Lewis, John H.: *See—*
Brueckner, Keith A.; and Lewis, John H., 4,072,289, Cl. 250-445.00T.

Lewis, Richard A., to Interdyne Company. Belt drive for tape transport, with floating rotor drive pressure application. 4,072,279, Cl. 242-192.000.

Lewis, Richard A., to Interdyne Company. Tape and/or film handling mechanism. 4,072,280, Cl. 242-195.000.

Lewis, William; Weldon, Peter J.; Hagedorn, Henry, Jr.; Hayes, Thomas E.; and Israels, Sylvan H., to United States of America, Army. Fuze encoder device. 4,072,108, Cl. 102-70.20R.

Leworthy, John Harwood: *See—*
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Oshima, Seiichi; and Miyamoto, Mamoru, 4,072,880, Cl. 318-227.000.
Terazono, Narihiro; Kamaike, Hiroshi; and Suzuki, Shigehiko, 4,072,212, Cl. 187-29.00R.
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Outsuka, Koremitsu; and Tanaka, Yutaka, 4,072,594, Cl. 204-195.00R.
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Miyatuka, Hajime, to Xerox Corporation. Method of treating photoconductive zinc oxide. 4,072,522, Cl. 96-1.800.

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Watanabe, Itaru; Yamakoshi, Yasumichi; Miyauchi, Hirotsugu; Tsushima, Sakae; and Fukumoto, Mitsunobu, 4,072,793, Cl. 428-255.000.

Miyazawa, Kuniaki. Carburetor. 4,072,139, Cl. 123-127.000.

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Andress, Harry J., Jr., 4,072,618, Cl. 252-46.600.
Due, George B.; and Guarino, John P., 4,072,592, Cl. 204-159.150.
Haag, Werner O.; and Whitehurst, Darrell Duayne, 4,072,720, Cl. 260-618.00H.
Leavitt, Richard Irwin, 4,072,606, Cl. 210-51.000.
Morgan, Charles R., Jr.; and Snyder, Paul W., Jr., 4,072,471, Cl. 23-288.0FB.
Schwartz, Albert B., 4,072,600, Cl. 208-120 000.

Moedritzer, Kurt, to Monsanto Company. Polymeric phosphine oxide flame retardants. 4,072,653, Cl. 260-45.70P.

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Mohon, Windell N., to United States of America, Navy. Microscope. 4,072,395, Cl. 350-33.000.

Mojica, Hector. Hammock having canopy. 4,071,917, Cl. 5-121.000.

Mol, Hans C.: *See—*
Brown, Michael A.; and Mol, Hans C., 4,072,304, Cl. 270-58.000.

Molitor, Victor D., to Stainless Equipment Company. Method of making heat exchanges. 4,071,935, Cl. 29-157.30R.

Monahan, Michael W.: *See—*
Amoss, Max S.; Monahan, Michael W.; and Vale, Wylie W., Jr., 4,072,668, Cl. 260-112.5LH.

Monsanto Company: *See—*
Bollinger, Frederic G.; and D'Amico, John J., 4,072,499, Cl. 71-94.000.
Hallcher, Richard C.; Baizer, Manuel M.; and White, Donald A., 4,072,583, Cl. 204-59.00R.
Hedrick, Ross M., 4,072,644, Cl. 260-29.6HN.
Hershman, Arnold; and Gambell, James W., 4,072,706, Cl. 260-502.500.
Moedritzer, Kurt, 4,072,653, Cl. 260-45.70P.
Tinker, Harold Burnham, 4,072,709, Cl. 260-535.00R.
Wolf, William D., 4,072,737, Cl. 264-97.000.

Moon, Malcolm W.; and Kornis, Gabriel, to Upjohn Company, The. Pyrazole amides. 4,072,498, Cl. 71-92.000.

Moore, Marvin W., to Microdot Inc. Lamp socket. 4,072,384, Cl. 339-59.00L.

Morel, Paul; and Dugois, Jean-Pierre, to Aluminum Pechiney. Method and apparatus for compensating the magnetic fields in adjacent rows of transversely arranged igneous electrolysis cells. 4,072,597, Cl. 204-243.00M.

Morgan, Charles R., Jr.; and Snyder, Paul W., Jr., to Mobil Oil Corporation. Catalytic converter for removing noxious components from a gaseous stream. 4,072,471, Cl. 23-288.0FB.

Morgan, Cleon C., to Donnelly Mirrors, Inc. Window assembly. 4,072,340, Cl. 296-84.00R.

Morgan, John H., to GTE Automatic Electric Laboratories Incorporated. Printed circuit board protector. 4,072,077, Cl. 83-418.000.

Morgan, Paul M.: *See—*
Siems, Lee E.; and Morgan, Paul M., 4,072,923, Cl. 340-15.5TS.

Mori, Naoharu: *See—*
Muto, Kiyoshi; Hisada, Toshihiko; Ohmori, Nobutsugu; Bessho, Satoshi; Mori, Naoharu; and Ishikawa, Katsuhiko, 4,071,996, Cl. 52-741.000.

Mori, Shunro: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Takamatsu, Akira; and Mori, Shunro, 4,072,753, Cl. 424-308.000.

Morita, Kazuo; Asano, Seiichi; and Masuma, Shigeharu, to Aichi Steel Works, Limited; and Kawasaki Steel Corporation. Device for inspecting inner diameter and bending of pipe. 4,071,958, Cl. 33-178.00B.

Morling, Roy W.; Mackert, Robert J.; and Kesl, Elmer M., to International Harvester Company. Self-cleaning sprocket. 4,072,062, Cl. 74-243.00R.

Morrell, Albert Maxwell, to RCA Corporation. Corrugated shadow mask assembly for a cathode ray tube. 4,072,876, Cl. 313-403.000.

Morrell, Roger J.; Gunn, Jerome A.; and Wilson, Richard J., to United States of America, Interior. Borehole aerostatic ground support system. 4,072,015, Cl. 61-35.000.

Morris, Fred J.; Waters, Robert L.; and Roberts, George F. Surveying of subterranean magnetic bodies from an adjacent off-vertical borehole. 4,072,200, Cl. 175-45.000.

Moss, Herbert L. Inspecting and measuring of soft contact lenses. 4,072,428, Cl. 356-244.000.

Motomura, Koichi, to Rank Xerox Ltd. Exposure device for a xerographic copying machine. 4,072,417, Cl. 355-67.000.

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Motoyoshi, Kenya; Kume, Masahiro; and Amano, Yoshinari, to Sumitomo Electric Industries, Ltd. Electrical contact material. 4,072,515, Cl. 75-173.00A.

Mount, Donald L. Centrifugal force controlled transmission. 4,072,066, Cl. 74-752.00F.

Mravic, Brian: *See—*
Shapiro, Stanley; Shapiro, Eugene; Mravic, Brian; and Watson, W. Gary, 4,072,513, Cl. 75-164.000.

Muehlthaler, Wolfgang: *See—*
Halbritter, Guenter; Muehlthaler, Wolfgang; Sperber, Heinrich; Diem, Hans; Dudeck, Christian; and Lehmann, Gunter, 4,072,717, Cl. 260-603.00C.

Mueller, Bruce M., to Owens-Illinois, Inc. Linerless closure. 4,072,244, Cl. 215-344.000.

Mueller, James P., to Caterpillar Tractor Co. Digital positioner for remote actuation of a control valve. 4,072,087, Cl. 91-461.000.

Muller, Erwin: *See—*
Honegger, Werner; and Muller, Erwin, 4,072,228, Cl. 198-459.000.

Muller, Werner Heinrich; Hey, Hansjorg; and Weil, Tomas, to Hoechst Aktiengesellschaft. Process for the manufacture of resorcinols. 4,072,660, Cl. 260-621.00H.

Mulligan, Vincent R., to L. K. Van Keuren Company, Inc. Assembly for supporting delicate equipment during shipping. 4,072,230, Cl. 206-334.000.

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Fillios, Jean-Pierre; and Kergueno, Joseph, 4,072,141, Cl. 126-270.000.

Munson, Ramon Jon; Hurd, Claude Calvert; and Weigl, James, to Bourns, Inc. Multistage mixing valve for a medical respirator. 4,072,148, Cl. 128-142.200.

Murakado, Hiroshi; Nakata, Kazuhiro; Usui, Eiki; Tamiya, Tetsuo; Chikuda, Masahiro; Kitao, Yoshinobu; and Fujiwara, Akira, to Kobe Steel, Ltd. Alloy sheet metal for fins of heat exchanger and process for preparation thereof. 4,072,542, Cl. 148-11.50A.

Murao, Sadatomi: *See—*
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Murari, Bruno; and Menniti, Pietro, to SGS-ATES Componenti Elettronici S.p.A. Audio amplifier with constant current consumption. 4,072,908, Cl. 330-265.000.

Murata, Kazuo; Tanso, Shiro; and Yamao, Junzo, to Yuasa Battery Company Limited. Storage battery, separator therefor. 4,072,802, Cl. 429-147.000.

Muroi, Tadashi: *See—*
Ishida, Masahiko; Oguri, Yoshitaka; Shimizu, Norio; and Muroi, Tadashi, 4,072,667, Cl. 260-112.00R.

Murphy, John E.; and Wolf, Chester, to Lever Brothers Company. Metering apparatus. 4,072,248, Cl. 222-56.000.

Murso, Bernhard; and Riedmuller, Eberhard, to Spieth, Ernst K. Target mechanism. 4,072,313, Cl. 273-105.200.

Mutchler, Paul A., to American Air Filter Company, Inc. Flexible fluid connecting device. 4,072,329, Cl. 285-187.000.

Muto, Kiyoshi; Hisada, Toshihiko; Ohmori, Nobutsugu; Bessho, Satoshi; Mori, Naoharu; and Ishikawa, Katsuhiko, to Kajima Kensetsu Kabushiki Kaisha. Process for reinforcing reinforced concrete post. 4,071,996, Cl. 52-741.000.

Naegeli, Peter, to Givaudan Corporation. 4-(2,6,6-Trimethyl-2-cyclohexen-1-ylidene)-butan-2-ol. 4,072,719, Cl. 260-617.00A.

Nagao, Taku: *See—*
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Nagata, Osamu: *See—*
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Naggar, Enever: *See—*
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Nagy, Joseph, to Union Special Corporation. Overedge stitch sewing machine. 4,072,116, Cl. 112-286.000.

Nahory, Robert Edward: *See—*
DeWinter, John Christian; Nahory, Robert Edward; and Pollack, Martin Alan, 4,072,544, Cl. 148-171.000.

Naito, Han-Ichiro. Structure adapted to be successively drawn and telescoped. 4,072,179, Cl. 160-197.000.

Naizer, Kenneth C.; and DuBose, Jesse K., to Texaco Inc. Method and system for detecting hydrogen in an inert gas stream. 4,072,043, Cl. 73-23.000.

Nakagawa, Kazuyuki; Uchida, Minoru; and Oka, Hiroaki, to Otsuka Pharmaceutical Co., Ltd. 3,4-Dihydrocarbostyril derivatives. 4,072,683, Cl. 260-288.00R.

Nakajima, Hiromichi: *See—*
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Nakamura, Youichi: *See—*
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Nakanishi, Kaname: *See—*
Teshima, Toru; Ehara, Takuhisa; and Nakanishi, Kaname, 4,072,005, Cl. 58-42.500.

Nakanishi, Yoshitaka. Method for forming counter-sunk hole in a base material and an apparatus for carrying out the same. 4,072,039, Cl. 72-334.000.

Nakase, Takamichi: *See—*
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Nakata, Kazuhiro: *See*—
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Nakata, Tetsuya; Yamada, Nobuo; Hashimoto, Akira; Takata, Yasuto; and Bunnomori, Yukinari, to Osaka Soda Co. Ltd. Cured or uncured compositions of homopolymers and copolymers of epihalohydrins. 4,072,734, Cl. 260-873.000.
Nakazawa, Shizumasa. Pressure control valve for a sphygmomanometer. 4,072,171, Cl. 137-599.200.
Nakazyo, Kiyoshi: *See*—
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National Research Development Corporation: *See*—
Bright, Alfred William; Overton, Michael Anthony Mersham; and Parker, Ian Frederick, 4,072,129, Cl. 118-629.000.
Dawson, Graham Robert; and Sansome, Dennis Hugh, 4,072,034, Cl. 72-56.000.
Ryder, Jack Forrester, 4,072,534, Cl. 106-98.000.
National Semiconductor Corporation: *See*—
Allen, Robert M., 4,072,581, Cl. 204-15.000.
Nauman, Harold Joseph, to Caterpillar Tractor Co. Engine cranking adapter. 4,072,063, Cl. 74-405.000.
NCR Corporation: *See*—
Gillow, George B., 4,072,869, Cl. 307-291.000.
Granzow, Robert H.; and Marvin, Richard P., 4,072,098, Cl. 101-32.000.
Towne, Gary L.; Depew, Noel F.; and Fowler, Charles A., 4,072,379, Cl. 339-17.0LM.
Nedelec, Lucien; Guillaume, Jacques; and Dumont, Claude, to Roussel Uclaf. 3-(3',4'-Disubstituted) phenyl piperidines. 4,072,685, Cl. 260-293.810.
Neef, Klaus: *See*—
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Neff, Roger Edgar: *See*—
Schiller, Arthur Maurice; Goodman, Richard Martin; and Neff, Roger Edgar, 4,072,607, Cl. 210-58.000.
Neidl, Herbert; Kaspar, Gunther; and Drossel, Rolf, to Siemens Aktiengesellschaft. Method and apparatus for the zone-wise shuffling of nuclear reactor fuel elements. 4,072,559, Cl. 176-19.0LD.
Nelson, Alden W., to Crompton & Knowles Corporation. Air cooling apparatus for vertical extruders. 4,072,185, Cl. 165-30.000.
Nelson, Yvette E. Apparatus for rocking a bed. 4,071,916, Cl. 5-62.000.
Nerge, Steven F.: *See*—
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Neyret, Guy, to Etablissements Genoud & Cie. Valve for disposable gas lighter. 4,072,290, Cl. 251-127.000.
Nibby, Chester M., Jr.: *See*—
Barlow, George J.; and Nibby, Chester M., Jr., 4,072,853, Cl. 235-312.000.
Nice-Pak Products, Inc.: *See*—
Julius, Robert P., 4,071,955, Cl. 32-34.000.
Nichiei Bussan Co., Ltd.: *See*—
Tanaka, Toshie, 4,071,930, Cl. 24-252.00R.
Nickell, Louis G., to W. R. Grace & Co. 2,6-Dichlorobenzaldehyde tetrahydro-2-furoyl hydrazone and its use as a ripener for sugarcane. 4,072,496, Cl. 71-88.000.
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De Nora, Oronzio; Nidola, Antonio; and Spaziante, Placido M., 4,072,586, Cl. 204-105.00M.
Niederhauser, Donald Olcott, to Du Pont de Nemours, E. I., and Company. Web forming method. 4,071,931, Cl. 28-101.000.
Niemann, Hans-Joachim; Schuster, Eberhard; and Kersting, Arno, to Kraftwerk Union Aktiengesellschaft. Method for separating isotopes from gaseous mixtures. 4,072,590, Cl. 204-157.10R.
Niemeyer, Lutz; and Ragaller, Klaus, to BBC Brown, Boveri & Company Limited. Electrical power switch with pressurized gas blasting device for lengthening the switching arc. 4,072,838, Cl. 200-148.00R.
Niemiec, Albin Joseph, to Sperry Rand Corporation. Power transmission. 4,072,451, Cl. 418-178.000.
Nifco Inc.: *See*—
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Nilsson, Ove, to Aktiebolaget Tudor. Production of lead powder for tube electrodes. 4,071,946, Cl. 29-623.100.
Nippert Company, The: *See*—
Nippert, Russell A., 4,071,947, Cl. 29-624.000.
Nippert, Russell A., to Nippert Company, The. Bimetal resistance welding electrode and method for making. 4,071,947, Cl. 29-624.000.
Nippon Electric Co., Ltd.: *See*—
Takayama, Yoichiro, 4,072,897, Cl. 324-158.00T.
Nippon Glass Measure Co., Ltd.: *See*—
Yamazaki, Seichi, 4,072,247, Cl. 222-47.000.
Nippon Kogaku K.K.: *See*—
Maida, Osamu, 4,072,962, Cl. 354-24.000.
Nippon Oil Company Limited: *See*—
Ito, Hiroyuki; and Imai, Hirosuke, 4,072,646, Cl. 260-29.70H.
Masunaga, Midori; Kohno, Yoshiki; and Hasegawa, Hiroshi, 4,072,620, Cl. 252-63.000.
Otsuki, Yutaka; Araki, Yoshihiko; and Aoyama, Kazuho, 4,072,536, Cl. 106-252.000.
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Nisikawa, Kazunori: *See*—
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Nissan Motor Company, Limited: *See*—
Hamada, Hideo, 4,072,220, Cl. 192-.075.
Katsumata, Masaaki; and Fujiki, Norio, 4,072,945, Cl. 343-7.0VM.
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Nitto Boseki Co., Ltd.: *See*—
Araki, Kunio; Sasaki, Takashi; Kasahara, Yuko; Yamashita, Yoshisada; Yotumoto, Keiichi; Sunaga, Hiromi; Tabei, Kiyoshi; Goto, Kazuo; Tajiri, Kunio; and Kittaka, Hirokama, 4,072,792, Cl. 428-246.000.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Apparatus for supplying rich air/fuel mixture in an internal combustion engine. 4,072,134, Cl. 123-75.00B.
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Nolet, Jean-Yves. Machine for bag closing and sealing. 4,071,999, Cl. 53-373.000.
Nomura, Kenji; Yoshioka, Kengo; and Goto, Toshihiro, to Toyoda-Koki Kabushiki-Kaisha. Article transfer apparatus. 4,072,236, Cl. 214-1.0BB.
Nomura, Motoi; Shirai, Yasuhiro; Yoshinaga, Yoshiaki; and Yamaizumi, Kouji, to NTN Toyo Bearing Co. Ltd. Pin type transfer apparatus for apertured-workpieces. 4,072,227, Cl. 198-370.000.
Nomura, Noboru; Kanai, Kenji; Kaminaka, Nobuyuki; and Nouchi, Norimoto, to Matsushita Electric Industrial Co., Ltd. Multi-element magnetic head. 4,072,993, Cl. 360-121.000.
Noonan, Charles M., to Westinghouse Electric Corporation. Thin film electrostatic epoxy powder coating process and the resulting article. 4,072,795, Cl. 428-379.000.
Nordlund, Karl Signar; and Berglund, Kjell. Driving assembly. 4,072,086, Cl. 91-418.000.
Nordqvist, Erik Gustaf Percy: *See*—
Ekenstam, Bo Thuresson Af; and Nordqvist, Erik Gustaf Percy, 4,072,249, Cl. 222-95.000.
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NTN Toyo Bearing Co. Ltd.: *See*—
Nomura, Motoi; Shirai, Yasuhiro; Yoshinaga, Yoshiaki; and Yamaizumi, Kouji, 4,072,227, Cl. 198-370.000.
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Nychka, Henry Robert; Eibeck, Richard Elmer; Robinson, Martin Alvin; and Jones, Edward Stephen, to Allied Chemical Corporation. Hydrogenation of fluorinated esters. 4,072,726, Cl. 260-633.000.
Nylite Skate Company of Canada Ltd.: *See*—
Chambers, Alan F., 4,071,938, Cl. 29-423.000.
Oberpriller, Jakob; and Hofmann, Dolf Dieter, to Linde Aktiengesellschaft. Method of cooling of articles and materials. 4,072,026, Cl. 62-63.000.
O'Brien, Thomas J.; Parsons, David A.; and Harger, Virginia Ruth, to O'Brien, Thomas J. Tent having veranda-style extension. 4,072,158, Cl. 135-1.00R.
Occidental Oil Shale, Inc.: *See*—
Bartel, William J.; and Burton, Robert S., III, 4,072,350, Cl. 299-2.000.
Oce'-Industries, Inc.: *See*—
Kratcoski, Frank L.; and Hausmann, Herbert H., 4,072,410, Cl. 353-68.000.
Oda, Kiyoshi, to Yoshida Kogyo K.K. Slider for a concealed slide fastener. 4,071,928, Cl. 24-205.10R.
O'Farrell, Charles P.; and Higgins, John J., to Exxon Research &

Engineering Co. High tensile strength elastomeric adhesive cements and laminates therefrom. 4,072,648, Cl. 260-33.4PQ.

Ogawa, Yutaka: *See*—
Inoue, Takehisa; Ogawa, Yutaka; Sugita, Hiroaki; and Watanabe, Namio, 4,072,217, Cl. 188-73.600.

Ogihara, Kenzo, to Olympus Optical Co., Ltd. Attachment for loudspeaker. 4,072,829, Cl. 179-146.00R.

Oguri, Yoshitaka: *See*—
Ishida, Masahiko; Oguri, Yoshitaka; Shimizu, Norio; and Muroi, Tadashi, 4,072,667, Cl. 260-112.00R.

Ohkubo, Kazuo: *See*—
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,743, Cl. 424-177.000.
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Chambers, Richard F.; and Granade, John J., 4,072,595, Cl. 204-219.000.
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Sato, Masaaki, 4,072,995, Cl. 360-137.000.
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Kizior, Thaddeus Eugene, 4,072,609, Cl. 210-73.00R.

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Smellie, Allan M.; and Brandstatter, Hans G., 4,072,510, Cl. 75-130.500.

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Schlafer, Ludwig; and Opitz, Konrad, 4,072,463, Cl. 8-41.00B.

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Close, Ralph E.; and Oroshnik, William, 4,072,725, Cl. 260-632.00R.

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Nakata, Tetsuya; Yamada, Nobuo; Hashimoto, Akira; Takata, Yasuto; and Bunnomori, Yukinari, 4,072,734, Cl. 260-873.000.

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Otis Elevator Company: *See*—
Salmon, John Kennedy, 4,072,213, Cl. 188-1.00B.

Otis Engineering Corporation: *See*—
Raulins, George M., 4,072,190, Cl. 166-.500.

Otsuka, Katsumi, to Teibow Company Limited. Writing instrument. 4,072,430, Cl. 401-265.000.

Otsuka Pharmaceutical Co., Ltd.: *See*—
Nakagawa, Kazuyuki; Uchida, Minoru; and Oka, Hiroaki, 4,072,683, Cl. 260-288.00R.

Otsuki, Yutaka; Araki, Yoshihiko; and Aoyama, Kazuho, to Nippon Oil Company, Ltd. Water-soluble coating compositions and process for their preparation. 4,072,536, Cl. 106-252.000.

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Gammer, Peter, 4,072,800, Cl. 429-97.000.

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Ovutime, Inc.: *See*—
Kopito, Louis, 4,072,045, Cl. 73-54.000.

Owens-Corning Fiberglas Corporation: *See*—
Hayden, David E.; and Foucht, Millard E., 4,072,623, Cl. 252-182.000.

Owens-Illinois, Inc.: *See*—
Amberg, Stephen; and Amberg, Ralph G., 4,072,549, Cl. 156-86.000.
Braker, Frederick Williams; Heckman, Russell William; Nickey, George Allen; and Potter, Terry Clair, 4,072,553, Cl. 156-423.000.
Kramer, Heinz; Peretti, Norbert; and Waschneck, Helmut, 4,072,491, Cl. 65-72.000.
Mueller, Bruce M., 4,072,244, Cl. 215-344.000.

Oyama, Fusao; Murao, Sadatomi; and Okada, Shizuo, to Sumitomo Chemical Company, Limited. Process for producing caprolactam. 4,072,678, Cl. 260-239.30A.

Ozeki, Banri, to Tokina Optical Co., Ltd. Prism system for use in tricolor separation. 4,072,405, Cl. 350-173.000.

P.C. Cox (Mastic Appliances) Limited: *See*—
Cox, John Patrick Anthony, 4,072,254, Cl. 222-391.000.

P. Leiner & Sons Limited: *See*—
Croome, Ronald John; and Thomas, Donald Beuford, 4,072,624, Cl. 252-301.350.

Padgett, Charles L.: *See*—
Drews, William A.; Padgett, Charles L.; and Pinna, Ray Anthony, 4,072,948, Cl. 343-18.00C.

Pako Corporation: *See*—
Caflisch, Jerry A., 4,072,061, Cl. 74-67.000.

Palara, Sergio, to SGS-ATES Componenti Elettronici S.p.A. Integrated power amplifier. 4,072,979, Cl. 357-36.000.

Pandula, Jan: *See*—
Kostura, Michal; Pandula, Jan; Harmansky, Absolon; Smiga, Slavomir; and Kepic, Stefan, 4,072,181, Cl. 164-154.000.

Pantzar, Glenn Goran Egon, to Sandvik Aktiebolaget. Chain saw guide bar. 4,071,953, Cl. 30-384.000.

Paradowski, Henri: *See*—
Becdelievre, Charles; Kaiser, Victor; and Paradowski, Henri, 4,072,485, Cl. 62-23.000.

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Vogt, Herwart Curt; Parekh, Manher; Cenker, Moses; and Patton, John Thomas, Jr., 4,072,631, Cl. 252-431.00R.

Parker, Dane K., to Goodyear Tire & Rubber Company, The. Process for preparing hindered alkenyl phenols. 4,072,724, Cl. 260-624.00B.

Parker, Gary D.; and Robb, E. S. Agricultural vehicle for transporting hay bales. 4,072,241, Cl. 214-392.000.

Parker, Ian Frederick: *See*—
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Parker Manufacturing Company: *See*—
LaPointe, Gabriel M., 4,072,441, Cl. 408-204.000.

Parkin, Thomas Randall, to Control Data Corporation. Multi-processor computer system. 4,073,005, Cl. 364-200.000.

Parsons, David A.: *See—*
O'Brien, Thomas J.; Parsons, David A.; and Harger, Virginia Ruth, 4,072,158, Cl. 135-1.00R.
Paton, Boris Evgenievich: *See—*
Zorev, Nikolai Nikolaevich; Astafiev, Anatoly Alexandrovich; Loboda, Alexandr Sergeevich; Savukov, Vladimir Pavlovich; Runov, Andrei Efimovich; Belov, Vladimir Alexandrovich; Sobolev, Jury Vasilievich; Sobolev, Valentin Vasilievich; Pavlov, Nikolai Mikhailovich; Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Balandin, Jury Fedorovich; Gorynin, Igor Vasilievich; Zvezdin, Jury Ivanovich; Ivanov, Kuzma Makeevich; Ignatov, Viktor Alexandrovich; and Emelyanenko, July Georgievich, 4,072,509, Cl. 75-124.000.
Patouillet, Jean Joseph Nicolas, to Antar Petroles de l'Atlantique. Process and apparatus for performing endothermic catalytic reactions. 4,072,601, Cl. 208-134.000.
Patton, John Thomas, Jr.: *See—*
Vogt, Herwart Curt; Parekh, Manher; Cenker, Moses; and Patton, John Thomas, Jr., 4,072,631, Cl. 252-431.00R.
Paulin, Arthur. Display rack. 4,072,246, Cl. 221-307.000.
Paulucci, Jeno F.: *See—*
Zimmer, Elvis Simon; and Hassell, David Allen, 4,072,093, Cl. 99-443.00R.
Pauluis, Gerard J. C. A., to Atomic Energy of Canada Limited. Interconnection arrangement for a dual temperature isotope exchange. 4,072,469, Cl. 23-260.000.
Pauwels, Edward M., to Bendix Corporation, The. Modulator for an adaptive braking system. 4,072,365, Cl. 303-115.000.
Pavlov, Nikolai Mikhailovich: *See—*
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Pavnica, Joseph F. Paperhanging hand tool and method. 4,072,547, Cl. 156-71.000.
Payen, Claude Andre: *See—*
Couderc, Georges; Payen, Claude Andre; Dansac, Jean; and Symaniec, Leonidas, 4,072,861, Cl. 250-233.000.
Payne, R. L.: *See—*
Westbrook, L. V.; and Payne, R. L., 4,072,890, Cl. 323-22.00R.
Pearson, James M.; Williams, David J.; and Limburg, William W., to Xerox Corporation. Photoconductive composition, and element. 4,072,519, Cl. 96-1.50R.
Pearson, Leonard Louis, to Fosroc International Limited. Soil consolidation method. 4,072,019, Cl. 61-36.00C.
Pedersen, Thor; and Kristiansen, Aksel Erik, to Elkem-Spigerverket A/S. Apparatus for plugging holes in an electric smelting furnace or the like. 4,072,250, Cl. 222-326.000.
Peka, Ivo: *See—*
Vodicka, Ludek; Peka, Ivo; and Suchy, Voktor, 4,072,508, Cl. 75-121.000.
Pelosi, Marco Antonio; and Apuzzio, Joseph J. Instrument and method for measuring urethral defects in patients with urinary stress incontinence. 4,072,144, Cl. 128-2.00S.
Pemco-Kalamazoo, Inc.: *See—*
Black, John W., 4,072,373, Cl. 308-191.000.
Pendlebury, David, to Allied Chemical Corporation. Transfer system for conveying polyester polymer. 4,072,663, Cl. 260-75.00M.
Pennwalt Corporation: *See—*
D'Angelo, Antonio Joseph; Mageli, Orville Leonard; and Sheppard, Chester Stephen, 4,072,810, Cl. 526-230.000.
Pentel, Jerry. Spark ignition device and fuel insection means for internal combustion engines. 4,072,131, Cl. 123-8.090.
Pentith, Gerald Richard Oldham, to Summit Mining Ltd. Fluid supply duct and pickup for mining machines. 4,072,355, Cl. 299-43.000.
Pepper, Roger T.; and Zack, Thomas A., to Fiber Materials, Inc. Graphite fiber/metal composites. 4,072,516, Cl. 75-229.000.
Perdahl, Orn Gunnar; and Santen, Sven Oscar, to Aktiebolaget Svenska Kullagerfabriken. Method of producing metal from metal oxides. 4,072,504, Cl. 75-40.000.
Peretti, Norbert: *See—*
Kramer, Heinz; Peretti, Norbert; and Waschneck, Helmut, 4,072,491, Cl. 65-72.000.
Perfection Enterprises, Inc.: *See—*
Wallo, William H., 4,072,386, Cl. 339-91.00R.
Perrella, Guido. Adjustment mechanism for day/night outside mirror 4,072,065, Cl. 74-502.000.
Perris, James, to James Perris Co., Inc., The. Heating control system. 4,072,268, Cl. 236-78.00C.
Perry, Sarah H.: *See—*
Land, Edwin H.; Bachelder, Albert J.; and Perry, Sarah H., 4,072,968, Cl. 354-86.000.
Petersen, Leo D. Drop cord reel. 4,072,278, Cl. 242-96.000.
Peterson, David G.: *See—*
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Peterson, Jerry R., to Geosource, Inc. Parameter compensating system for a flowmeter. 4,072,051, Cl. 73-194.00M.
Petitpierre, Jean-Claude: *See—*
Garner, Robert; Henshall, John Barry; and Petitpierre, Jean-Claude, 4,072,690, Cl. 260-326.14R.
Petterson, Stig Arvid; Lindstad, Tor; Dyvik, Froystein; and Steintveit, Georg, to Det Norske Zinkkompani A/S. Thermal treatment of leaching residue from hydrometallurgical zinc production. 4,072,503, Cl. 75-14.000.
Pfeuffer, Alfred; Rudolf, Herbert; and Balfanz, Fred, to C-R-O, Inc. Continuous casting cut-off device. 4,072,300, Cl. 266-50.000.
Pharmacia AS: *See—*
Hedegaard, Kurt, 4,072,760, Cl. 424-330.000.
Phillips, Carmen S., to International Harvester Company. Baler gate hydraulic lock. 4,072,096, Cl. 100-53.000.
Phillips, Peter J., to Gartner, Klaus; and Uyeda, Tim. Key changeable lock. 4,072,032, Cl. 70-339.000.
Phillips Petroleum Company: *See—*
Billings, William G., 4,072,718, Cl. 260-608.000.
Bjornson, Geir, 4,072,713, Cl. 260-567.60M.
Bost, Howard W., 4,072,643, Cl. 260-23.00H.
Cheng, Paul J., 4,072,468, Cl. 23-259.500.
Clampitt, Richard L., 4,072,191, Cl. 166-261.000.
Farha, Floyd, Jr.; and Box, E. O., Jr., 4,072,608, Cl. 210-63.00R.
Richards, Frank P.; and Taylor, Raymond C., 4,072,226, Cl. 198-345.000.
Uraneck, Carl A.; and Brown, James D., 4,072,807, Cl. 526-48.100.
Phillips, Robert C., to Gimix, Inc. Automatic dialer for paging system or the like. 4,072,824, Cl. 179-18.00B.
Phillips, Wayne M.: *See—*
United States of America, National Aeronautics and Space Administration; and Phillips, Wayne M., 4,072,532, Cl. 106-65.000.
Phinney, John M., to Falk Corporation, The. Marine clutch and throttle governor control system. 4,072,221, Cl. 192-.098.
Physical Systems, Inc.: *See—*
Hutter, Charles G., III, 4,072,333, Cl. 292-292.000.
Pi, Alberto: *See—*
Larson, Gerald L.; Pi, Alberto; and Uitvlugt, Martin W., 4,072,206, Cl. 180-105.00E.
Pichler, Herman P.: *See—*
Haag, Michael; and Pichler, Herman P., 4,072,917, Cl. 335-205.000.
Pierce Chemical Company: *See—*
Gindler, E. Melvin, 4,072,627, Cl. 252-408.000.
Pierson, Neil W. Small, personal, all terrain vehicle. 4,072,203, Cl. 180-9.440.
Pierson, Robert M.; and Lovell, John A., to Goodyear Tire & Rubber Company, The. Method of forming shaped articles. 4,072,738, Cl. 264-102.000.
Pinna, Ray Anthony: *See—*
Drews, William A.; Padgett, Charles L.; and Pinna, Ray Anthony, 4,072,948, Cl. 343-18.00C.
Pinto, Alwyn, to Imperial Chemical Industries Limited. Steam-hydrocarbon process. 4,072,625, Cl. 252-373.000.
Pirk, Harald, to Metzeler Kautschuk AG. Apparatus for the production of laminated bodies particularly, multilayered shoe soles. 4,072,461, Cl. 425-515.000.
Pitney-Bowes, Inc.: *See—*
Brown, Michael A.; and Mol, Hans C., 4,072,304, Cl. 270-58.000.
Storace, Anthony, 4,072,202, Cl. 177-229.000.
Pitt, Leland S.; and Large, George B., to Stauffer Chemical Company. Substituted vinyl thiophosphate activators. 4,072,745, Cl. 424-200.000.
Plaessmann, Frederick August, to Seal-Spout Corporation. Canister indexing spout-inserting machine. 4,072,117, Cl. 113-1.00H.
Pletka, Hans-Dieter; and Michel, Rudolf, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of sulfur containing organosilicon compounds. 4,072,701, Cl. 260-448.80R.
Pluss-Staufer AG: *See—*
Horn, Herwig, 4,072,426, Cl. 356-212.000.
Pneumo Corporation: *See—*
Bradley, Charles Duane, Jr., 4,072,165, Cl. 137-493.000.
Polaroid Corporation: *See—*
Gold, Nicholas, 4,072,972, Cl. 354-275.000.
Land, Edwin H.; Bachelder, Albert J.; and Perry, Sarah H., 4,072,968, Cl. 354-86.000.
Pope, William R., 4,072,964, Cl. 354-33.000.
Polizzi, Charles J.; and DeCola, Charles R. Hexagonally shaped rotating display with tetrahedral elements. 4,071,968, Cl. 40-473.000.
Pollack, Martin Alan: *See—*
DeWinter, John Christian; Nahory, Robert Edward; and Pollack, Martin Alan, 4,072,544, Cl. 148-171.000.
Pollet, Robert Joseph; Sels, Francis Jeanne; and Vandeputte, Camille Angelina, to AGFA-GEVAERT, N.V. Development of photographic silver halide material. 4,072,523, Cl. 96-22.000.
Pollet, Robert Joseph: *See—*
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Polo, Francois. Numbering machine assembly especially adapted for use with printing machinery. 4,072,100, Cl. 101-79.000.
Polovinkin, Evgeny Petrovich: *See—*
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Polychrome Corporation: *See—*
Golda, Eugene; Huang, Jen-chi; Shimazu, Ken-ichi; and Chu, Simon Long, 4,072,589, Cl. 204-129.400.
Pomerantz, Allen J., to General Motors Corporation. Automotive priority message display. 4,072,924, Cl. 340-52.00F.
Pommerening, Rudiger. Roller skate having ankle bracing support. 4,072,317, Cl. 280-11.230.

Pont-A-Mousson S.A.: *See*—
Bellehache, Pierre; and Le Troadec, Yves, 4,072,162, Cl. 137-71.000.
Pontiac Furniture Industries, Inc.: *See*—
Johnson, Carl B.; and James, Henry, 4,072,342, Cl. 297-84.000.
Pope, William R., to Polaroid Corporation. Scene light responsive variable quench time delay for quench strobe. 4,072,964, Cl. 354-33.000.
Potter, Terry Clair: *See*—
Braker, Frederick Williams; Heckman, Russell William; Nickey, George Ailen; and Potter, Terry Clair, 4,072,553, Cl. 156-423.000.
Pouli, Dirk: *See*—
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Powell, Leon A. Coupling element for trailer hitches. 4,072,320, Cl. 280-415.00A.
Powers, Thomas R., to TRW Inc. Insert type drill and insert therefor. 4,072,438, Cl. 408-59.000.
PPG Industries, Inc.: *See*—
Castine, William A., Jr., 4,072,492, Cl. 65-107.000.
Franz, Helmut, 4,072,772, Cl. 427-164.000.
Imler, Vaughn R., 4,072,493, Cl. 65-107.000.
Sickles, James E.; and Tepper, Richard M., 4,073,002, Cl. 361-227.000.
Welton, Sanford M., 4,072,259, Cl. 225-2.000.
Pradal, Bortolo Mario, to RCA Corporation. Network for temperature compensation of an AT cut quartz crystal oscillator. 4,072,912, Cl. 331-116.00R.
Price, Raymond R., to Rochester Silo, Inc. Automatic silo door construction. 4,071,977, Cl. 49-70.000.
Procter & Gamble Company, The: *See*—
Rose, Terence James, 4,072,621, Cl. 252-89.00R.
Provencher, Joseph H., to United States of America, Navy. Multifrequency array using common phasors. 4,072,956, Cl. 343-844.000.
Psaltis, Demetri: *See*—
Casasent, David Paul; and Psaltis, Demetri, 4,073,010, Cl. 364-822.000.
Pun, Kwok-Wah, to Fung, Cheung King. Fire heat detector and/or burglar alarm. 4,072,933, Cl. 340-229.000.
Purvis, Joseph R.: *See*—
Chuss, John T.; Krechel, Henry H.; and Purvis, Joseph R., 4,071,944, Cl. 29-574.000.
Quast, Eberhard: *See*—
Scheid, Karl; Schweibfurt, Werner; and Quast, Eberhard, 4,072,305, Cl. 271-3.000.
Quinby, Thomas C., to United States of America, Energy. Method of producing homogeneous mixed metal oxides and metal-metal oxide mixtures. 4,072,501, Cl. 75-.5BC.
R. E. Dupont Research and Investment Services Limited: *See*—
Walker, Alan John, 4,072,446, Cl. 417-420.000.
Radkowski, Stanley J.; Lawrence, John M.; Naggar, Enever; and Dunham, Raymond W., to Diamond International Corporation. Self-extinguishing match and method of manufacture. 4,072,473, Cl. 44-46.000.
Ragaller, Klaus: *See*—
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Ragulina, Raisa Ivanovna: *See*—
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.
Rajcevic, Harold P.; Opie, William R.; and Cusanelli, Dominic C., to Amax Inc. Production of blister copper in a rotary furnace from calcined copper-iron concentrates. 4,072,507, Cl. 75-74.000.
Ramos, Joseph: *See*—
Cole, Robert Clay; Koch, Ronney R.; and Ramos, Joseph, 4,072,194, Cl. 166-295.000.
Rampel, Hans; Hess, Peter; and Becker, Herbert, to Metallwerk Max Brose & Co. Window arrangement with sliding pane. 4,071,978, Cl. 49-348.000.
Randall-Ford, Mattias J.: *See*—
Servin, Arturo; and Servin, Jose, 4,072,042, Cl. 72-457.000.
Randall, Robert E., to Rowland, Incorporated. Sheet material with multicolor striated pattern. 4,072,791, Cl. 428-221.000.
Rank Xerox Ltd.: *See*—
Fujizuka, Kaoru, 4,072,418, Cl. 355-75.000.
Motomura, Koichi, 4,072,417, Cl. 355-67.000.
Ransomes Sims & Jefferies Limited: *See*—
Aldred, Edward John, 4,072,001, Cl. 56-7.000.
Rapoport, Vladimir Mendeleevich: *See*—
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.
Rasile, John: *See*—
Gedney, Ronald Walker; and Rasile, John, 4,072,816, Cl. 174-52.0FP.
Raue, Roderich: *See*—
Walther, Herbert; Hartig, Wolfgang; Friedrich, Adolf; and Raue, Roderich, 4,072,911, Cl. 331-94.50L.
Raulins, George M., to Otis Engineering Corporation. Motion compensator. 4,072,190, Cl. 166-.500.
Rausch, Richard E., to UOP Inc. Dehydrocyclization with an acidic multimetallic catalytic composite. 4,072,731, Cl. 260-673.500.
Ravey, Mani; Shorr, Leonard Marshall; and Waterman, Jacques A., deceased (by Frankel, Jacob, administrator), to IMI (TAMI) Institut for Research and Development. Novel vinyl chloride polymers and process for their production. 4,072,806, Cl. 526-89.000.
Ray, Carl L. CB Radio accessory unit. 4,072,900, Cl. 325-67.000.
Raymond Lee Organization, Inc., The: *See*—
Jury, Daniel E., 4,071,921, Cl. 15-227.000.
Richardson, Victor M., 4,072,091, Cl. 99-323.500.
Raynaud, Guy M.: *See*—
Fauran, Claude P.; Turin, Michel J.; Imbert, Thierry F.; Raynaud, Guy M.; and Dorme, Nicole A. M., 4,072,682, Cl. 260-268.0BC.
Raytheon Company: *See*—
Chambers, Derek, 4,073,003, Cl. 363-20.000.
Chambers, Derek; and Harley, A. Leonard, 4,073,004, Cl. 363-79.000.
Lind, Earl R., 4,072,892, Cl. 324-30.00B.
RCA Corporation: *See*—
Aschwanden, Felix, 4,072,983, Cl. 358-19.000.
Dingwall, Andrew Gordon Francis; and Rosenthal, Bruce David, 4,072,910, Cl. 331-57.000.
Ipri, Alfred Charles, 4,072,974, Cl. 357-23.000.
Johnson, Henry Charles, 4,072,947, Cl. 343-14.000.
Kaganowicz, Grzegorz; and Robinson, John Walter, 4,072,985, Cl. 358-128.000.
Keelty, James Malcolm, 4,072,905, Cl. 329-122.000.
Miller, Jeffrey Ellis, 4,072,943, Cl. 343-6.5LC.
Morrell, Albert Maxwell, 4,072,876, Cl. 313-403.000.
Pradal, Bortolo Mario, 4,072,912, Cl. 331-116.00R.
Treadwell, Richard Julian, 4,072,884, Cl. 318-314.000.
Read, Reginald A., Jr., to Regdon Corporation. Bistable electromagnetic actuator. 4,072,918, Cl. 335-236.000.
Rebold, Jerome I.: *See*—
Meshulam, Avram; and Rebold, Jerome I., 4,071,952, Cl. 30-151.000.
Rebours, Albert: *See*—
Carre, Christian; Guibet, Jean-Pierre; Rebours, Albert; and Rigal, Andre, 4,072,484, Cl. 55-379.000.
Recognition Equipment Incorporated: *See*—
McWaters, Lynn D., 4,072,859, Cl. 250-214.00R.
Rector, Michael H., to Rector & Wolfe Incorporated. Protective gloves. 4,071,913, Cl. 2-20.000.
Rector & Wolfe Incorporated: *See*—
Rector, Michael H., 4,071,913, Cl. 2-20.000.
Reed, David Alan, to Lever Brothers Company. Dishwashing compositions. 4,072,632, Cl. 252-541.000.
Reed, William R.: *See*—
Barrall, Jeffery L.; and Reed, William R., 4,072,533, Cl. 106-84.000.
Reeves, H. Neal: *See*—
Taner, M. Turhan; Sheriff, Robert E.; and Reeves, H. Neal, 4,072,922, Cl. 340-15.5CP.
Regdon Corporation: *See*—
Read, Reginald A., Jr., 4,072,918, Cl. 335-236.000.
Regehr, Ulrich; and Bulang, Siegfried. Mist remover. 4,072,478, Cl. 55-440.000.
Rehder, Robert Henry: *See*—
Boothman, David Richard; Rehder, Robert Henry; and Elgar, Everett Charles, 4,072,997, Cl. 361-103.000.
Reinhardt, Helmut; Trebinger, Karl; and Kallrath, Gottfried, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for hydrophobization of finely divided silica and silicates using prepolycondensed organosilane. 4,072,796, Cl. 428-405.000.
Reinhoudt, David N.; and Gray, Robin Th., to Shell Oil Company. Macrocyclic polyethers. 4,072,693, Cl. 260-338.000.
Reiniger, Haigh McDiarmid, to Southeast SBIC, Inc. Process for dry recovery of materials from solid refuse. 4,072,273, Cl. 241-24.000.
Reismuller, Anton, to Remesta GmbH. Method and apparatus for monitoring intake manifold vacuum. 4,072,047, Cl. 73-115.000.
Remesta GmbH: *See*—
Reismuller, Anton, 4,072,047, Cl. 73-115.000.
Reschke, Kurt W. Safety outlet. 4,072,382, Cl. 339-40.000.
Reuter, Herbert: *See*—
Kuhling, Dieter; Huppertz, Josef; Krings, Peter; and Reuter, Herbert, 4,072,622, Cl. 252-179.000.
Revertex (South Africa) (Proprietary) Limited: *See*—
Bishop, Richard T., 4,072,020, Cl. 61-36.00C.
Revue Thommen AG: *See*—
Budmiger, Hermann, 4,071,912, Cl. 2-8.000.
Reymann, Wolfgang: *See*—
Appel, Adolf; and Reymann, Wolfgang, 4,072,456, Cl. 425-183.000.
Reynolds, John Harvey: *See*—
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Reynolds Metals Company: *See*—
Bullough, Vaughn L.; and Daley, Luther O., 4,072,599, Cl. 204-294.000.
Rhodes, Ignace. Processes of cooling foods and apparatus therefor. 4,072,762, Cl. 426-510.000.
Rhone-Progil: *See*—
Costes, Jean-Raymond; Strini, Jean-Claude; and Hardouin, Serge, 4,072,728, Cl. 260-660.000.
Richards, Frank P.; and Taylor, Raymond C., to Phillips Petroleum Company. Conveyor apparatus for use with a container manufacturing apparatus. 4,072,226, Cl. 198-345.000.
Richardson, Victor M., to Raymond Lee Organization, Inc., The, a part interest. Portable electric heating device for popping corn. 4,072,091, Cl. 99-323.500.
Ricks, Earl C., to United States of America, Army. Laminated wall tubing. 4,072,787, Cl. 428-594.000.
Ridha, Raouf Abdul, to Firestone Tire & Rubber Company, The. Compression molded cut-fiber reinforced plastic wheels. 4,072,358, Cl. 301-63.0PW.
Riedmuller, Eberhard: *See*—
Murso, Bernhard; and Riedmuller, Eberhard, 4,072,313, Cl. 273-105.200.
Riegler, Ernst; and Schmidt, Manfred, to Vereinigte Osterreichische Eisen- und Stahlwerke Alpine Montan Aktiengesellschaft. Tiltable metallurgical vessel arrangement. 4,072,302, Cl. 266-245.000.
Rietberg, Johan: *See*—
van der Linde, Robert; Meijerink, Gerardus Franciscus; and Rietberg, Johan, 4,072,662, Cl. 260-75.00R.
Rigal, Andre: *See*—
Carre, Christian; Guibet, Jean-Pierre; Rebours, Albert; and Rigal, Andre, 4,072,484, Cl. 55-379.000.
Ritz, Jurgen; Zimmermann, Rolf; and Fischer, Hannes, to Hoechst Aktiengesellschaft. Alkyd resins. 4,072,642, Cl. 260-22.0CB.
Rixson-Firemark, Inc.: *See*—
Haag, Michael; and Pichler, Herman P., 4,072,917, Cl. 335-205.000.
Robb, E. S.: *See*—
Parker, Gary D.; and Robb, E. S., 4,072,241, Cl. 214-392.000.
Robert Bosch GmbH: *See*—
Heiser, Joachim; Hoheisel, Rainer; Flaschar, Heinz; Gand, Heinz; Kleinschmidt, Heinz; Braunlinger, Konrad; Sopha, Klaus; Schempp, Roland; and Sanzenbacher, Hermann, 4,072,169, Cl. 137-596.130.
Lockbrunner, Eduard; and Schnepf, Dietmar, 4,072,378, Cl. 339-17.00C.
Wanner, Karl, 4,072,199, Cl. 173-131.000.
Roberts, Darrel V. Foldable backstop and like structure. 4,072,295, Cl. 256-26.000.
Roberts, David J.; and Mauri, Jacinto Moragues, to Antonio Gallardo, S.A. Derivatives of 1,2-diphenyl-3,5-dioxo-4-n-butyl-pyrazolidine and process for making same. 4,072,747, Cl. 424-270.000.
Roberts, George F.: *See*—
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Robin, Michel: *See*—
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Robinson, John Walter: *See*—
Kaganowicz, Grzegorz; and Robinson, John Walter, 4,072,985, Cl. 358-128.000.
Robinson, Martin A.: *See*—
Berenbaum, Morris B.; Evans, Francis E.; Eibeck, Richard E.; and Robinson, Martin A., 4,072,027, Cl. 62-112.000.
Robinson, Martin Alvin: *See*—
Nychka, Henry Robert; Eibeck, Richard Elmer; Robinson, Martin Alvin; and Jones, Edward Stephen, 4,072,726, Cl. 260-633.000.
Roche, Stanley E.: *See*—
Waight, William J.; and Roche, Stanley E., 4,072,431, Cl. 403-158.000.
Rochester Silo, Inc.: *See*—
Price, Raymond R., 4,071,977, Cl. 49-70.000.
Rochlitz, Jurgen; and Schon, Gunter, to Hoechst Aktiengesellschaft. Electrophotographic dual layer recording material. 4,072,520, Cl. 96-1.50R.
Rockwell International Corporation: *See*—
Schoeneweis, E. Frederick; and Stephens, Leonard J., 4,072,161, Cl. 137-68.00R.
Rockwell-Rimoldi S.p.A.: *See*—
Marforio, Nerino, 4,072,115, Cl. 112-205.000.
Rodgers, Gregory D.: *See*—
Aldridge, Clifton; Gibson, Sandra F.; and Rodgers, Gregory D., 4,072,573, Cl. 195-100.000.
Gibson, Sandra F.; and Rodgers, Gregory D., 4,072,571, Cl. 195-100.000.
Lanham, James W.; Rodgers, Gregory D.; and Meyer, Michael C., 4,072,572, Cl. 195-100.000.
Rogachev, Viktor Igorevich; Sukhorukov, Vasily Vasilievich; and Shkatov, Petr Nikolaevich. Eddy current converter for non-destructive testing of electrically conducting coating in holes of printed circuit boards. 4,072,895, Cl. 324-238.000.
Rogan, John B., to Standard Oil Company (Indiana). Catalyst and process for the polymerization of alpha-olefins. 4,072,809, Cl. 526-136.000.
Rohe, Lothar; Schramm, Jurgen; Klauke, Erich; Eue, Ludwig; and Schmidt, Robert Rudolf, to Bayer Aktiengesellschaft. Halogenated 4-trifluoromethyl-diphenyl-ether compounds and herbicidal compositions. 4,072,500, Cl. 71-98.000.
Rohlig, Rainer, to Sintermetallwerk Krebsoge GmbH. Filter cartridge with folded filter sheath. 4,071,937, Cl. 29-420.000.
Rohlig, Rainer, to Sintermetallwerk Krebsoge GmbH. Filter cartridge. 4,072,616, Cl. 210-493.00R.
Rohm and Haas Company: *See*—
Kuhn, Robert R.; and Machleder, Warren H., 4,072,474, Cl. 44-58.000.
Romagnoli, Andrea. Device for forming orderly arranged groups of packages from a continuous web of packages. 4,072,074, Cl. 83-85.000.
Romanowski, Chester J., to Foster Wheeler Energy Corporation. Pulverizer with caster roller assembly. 4,072,276, Cl. 241-117.000.
Rose, Frederick A., to Norland Corporation. Waveform measuring instrument with resident programmed processor for controlled waveform display and waveform data reduction and calculation. 4,072,851, Cl. 364-487.000.
Rose, Terence James, to Procter & Gamble Company, The. Detergent composition. 4,072,621, Cl. 252-89.00R.
Rosen, Beverly; and Tepper, Sidney A., to Lasco Toys International Inc. Sound-producing mirror toy. 4,072,314, Cl. 273-161.000.
Rosenbaum, Georges: *See*—
Bouillon, Claude; and Rosenbaum, Georges, 4,072,742, Cl. 424-47.000.
Rosenberg, William E., to Columbia Chemical Corporation. Aqueous acid plating bath and additives for producing bright electrodeposits of tin. 4,072,582, Cl. 204-54.00R.
Rosenthal, Bruce David: *See*—
Dingwall, Andrew Gordon Francis; and Rosenthal, Bruce David, 4,072,910, Cl. 331-57.000.
Ross, Cecil Jack; and Thompson, John Fred, to W. R. Weaver. Apparatus fur securin a spherical body to a supporting member. 4,071,949, Cl. 29-818.000.
Ross, Cecil Jack, to W. R. Weaver. Focussing objective mechanism for telescopic rifle sights. 4,072,396, Cl. 350-46.000.
Ross, Thomas H. Mirror attachment for shower head. 4,072,397, Cl. 350-61.000.
Roth, Ronald W.: *See*—
Voss, Hubert E.; and Roth, Ronald W., 4,072,271, Cl. 239-541.000.
Rothbart, Herbert L.: *See*—
Luddy, Francis E.; Hampson, James W.; Herb, Samuel F.; and Rothbart, Herbert L., 4,072,766, Cl. 426-607.000.
Rothlisberger, Melvin Albert. High ground clearance passenger vehicle handle apparatus. 4,072,339, Cl. 296-71.000.
Roundy, Carlos B. Pyroelectric infrared detection system. 4,072,863, Cl. 250-332.000.
Roussel UCLAF: *See*—
Buendia, Jean; Vivat, Michel; and Schalbar, Jeanine, 4,072,755, Cl. 424-312.000.
Nedelec, Lucien; Guillaume, Jacques; and Dumont, Claude, 4,072,685, Cl. 260-293.810.
Rouviere, Roger Francois: *See*—
Tiraspolsky, Wladimir; and Rouviere, Roger Francois, 4,072,166, Cl. 137-496.000.
Rowland, Incorporated: *See*—
Randall, Robert E., 4,072,791, Cl. 428-221.000.
Rowland, Stanley P.: *See*—
Cirino, Vidabelle O.; and Rowland, Stanley P., 4,072,784, Cl. 428-507.000.
Roy L. Wines & Son, Inc.: *See*—
Wines, Roy Layton, Jr.; and Wines, Roy Layton, III, 4,072,157, Cl. 134-58.00R.
Roye, Henry L. Radial mining method. 4,072,351, Cl. 299-11.000.
Rubner, Roland: *See*—
Kleeberg, Wolfgang; Rubner, Roland; and Bartel, Wieland, 4,072,524, Cl. 96-35.100.
Rucker Company, The: *See*—
Balston, John C., 4,072,122, Cl. 114-230.000.
Rudin, Melvin: *See*—
Cady, Paxton; Omura, Takeshi; Rudin, Melvin; and Fleming, James H., 4,072,578, Cl. 195-127.000.
Rudolf, Herbert: *See*—
Pfeuffer, Alfred; Rudolf, Herbert; and Balfanz, Fred, 4,072,300, Cl. 266-50.000.
Rudolph, Rene, to BBC Brown, Boveri & Company Limited. Method and arrangement for arc quenching in arresters. 4,072,996, Cl. 361-134.000.
Ruhnau, Gerhard: *See*—
Gudat, Wolfgang; and Ruhnau, Gerhard, 4,072,364, Cl. 303-95.000.
Ruhrchemie AG: *See*—
Feichtinger, Hans; Lutze, Siegfried; Birnkraut, Hans-Walter; and Kluy, Werner, 4,072,659, Cl. 260-57.00A.
Rumyantsev, Vasily Petrovich: *See*—
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.
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Zorev, Nikolai Nikolaevich; Astafiev, Anatoly Alexandrovich; Loboda, Alexandr Sergeevich; Savukov, Vladimir Pavlovich;

Runov, Andrei Efimovich; Belov, Vladimir Alexandrovich; Sobolev, Jury Vasilievich; Sobolev, Valentin Vasilievich; Pavlov, Nikolai Mikhailovich; Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Balandin, Jury Fedorovich; Gorynin, Igor Vasilievich; Zvezdin, Jury Ivanovich; Ivanov, Kuzma Makeevich; Ignatov, Viktor Alexandrovich; and Emelyanenko, July Georgievich, 4,072,509, Cl. 75-124.000.

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Russell, Anthony William: *See*—
Russell, Michael King; and Russell, Anthony William, 4,071,959, Cl. 33-312.000.

Russell, Michael King; and Russell, Anthony William. Gyro-stabilized single-axis platform. 4,071,959, Cl. 33-312.000.

Ruzicka, Leo J. Vacuum spoiler for pickup. 4,072,336, Cl. 296-1.00S.

Ryan, Robert Allan: *See*—
Manning, Donald Franklin; and Ryan, Robert Allan, 4,072,225, Cl. 197-133.00R.

Rydborn, Sten-Ake Olaus. Apparatus for indicating whether one or more objects are in motion. 4,072,935, Cl. 340-259.000.

Ryder, Jack Forrester, to National Research Development Corporation. Super sulphate cement reinforced with glass fibers. 4,072,534, Cl. 106-98.000.

Ryzhikov, Igor Veniaminovich: *See*—
Karatsjuba, Anatoly Prokofievich; Kmita, Tatyana Georgievna; Kruglov, Igor Ivanovich; Kurinny, Vladimir Ivanovich; Kurnosov, Anatoly Ivanovich; Ryzhikov, Igor Veniaminovich; and Judin, Vladimir Vasilievich, 4,071,945, Cl. 29-578.000.

Rzhavin, Sergei Alexandrovich: *See*—
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.

S & C Electric Company: *See*—
Krejsa, Richard E., 4,073,000, Cl. 361-344.000.

Sacchetti, Peter John, to AMF Incorporated. Low inductance precision resistor deposited on an adhesive backing and wound on a bobbin. 4,072,921, Cl. 338-61.000.

Sadler, Boyd. Boat jacks. 4,072,293, Cl. 254-89.00R.

Saeman, Walter C., to Olin Corporation. Rotary dryers. 4,071,962, Cl. 34-135.000.

Saggers, David Thomas: *See*—
Gates, Peter Stuart; Gillon, John; and Saggers, David Thomas, 4,072,495, Cl. 71-76.000.

Sagner, Max; and Souquet, Jacques, to Bertin & Cie. Pressure-relieving device for steam generators and the like. 4,072,170, Cl. 137-599.000.

Saito, Humitoshi: *See*—
Tsujihara, Toshio; Saito, Humitoshi; and Kitamori, Teruaki, 4,072,315, Cl. 274-1.00E.

Sakabe, Nobuyuki: *See*—
Sekiya, Mamoru; and Sakabe, Nobuyuki, 4,072,907, Cl. 330-261.000.

Saletta, Gary F.: *See*—
Engel, Joseph C.; and Saletta, Gary F., 4,072,878, Cl. 315-205.000.

Salk Institute for Biological Studies, The: *See*—
Amoss, Max S.; Monahan, Michael W.; and Vale, Wylie W., Jr., 4,072,668, Cl. 260-112.5LH.

Salmon, John Kennedy, to Otis Elevator Company. Suspended cable apparatus. 4,072,213, Cl. 188-1.00B.

Saltzman, William H., to Intellectual Property Development Corporation. 3α,7α-Dihydroxy-cholanic acid derivatives. 4,072,695, Cl. 260-397.100.

Sanday, Santiago C., to Westinghouse Electric Corporation. Gas turbine combustor employing plural catalytic stages. 4,072,007, Cl. 60-39.69A.

Sanders Associates, Inc.: *See*—
Bianco, Joseph F.; Senio, Nicholas; Hawes, Russell B.; and Strang, Donald B., 4,072,944, Cl. 343-7.0PF.

Sanderson, Allan, to Welding Institute, The. Electron beam welding generators. 4,072,356, Cl. 219-121.0EB.

Sandoz Ltd.: *See*—
Bohler, Hans; and Griesser, Rolf, 4,072,700, Cl. 260-438.100.
Ebnother, Anton; Bastian, Jean-Michel; Gadient, Fulvio; and Stoll, Andre, 4,072,756, Cl. 424-267.000.
Henzi, Beat, 4,072,672, Cl. 260-205.000.

Sandoz, Oscar A.: *See*—
Hamid, Michael A.; and Sandoz, Oscar A., 4,072,941, Cl. 343-5.0NA.

Sandvik Aktiebolaget: *See*—
Pantzar, Glenn Goran Egon, 4,071,953, Cl. 30-384.000.

Sanematsu, Hisato: *See*—
Chibata, Ichiro; Yamada, Shigeki; Yamamoto, Masao; and Sanematsu, Hisato, 4,072,691, Cl. 260-326.14T.

Sangamo Weston, Inc.: *See*—
Wilder, Joseph, 4,072,928, Cl. 340-146.30H.

Sankovich, Melvin F., to Babcock & Wilcox Company, The. Device to accept axial forces occurring on fuel assemblies during the operation of nuclear reactors. 4,072,562, Cl. 176-50.000.

Sano, Konosuke: *See*—
Togo, Kazushi; Tamura, Fumihide; Yasuda, Naohiko; Ichikawa, Takehiko; Sano, Konosuke; Matsuda, Keizo; and Mitsugi, Koji, 4,072,687, Cl. 260-306.70T.

Sansome, Dennis Hugh: *See*—
Dawson, Graham Robert; and Sansome, Dennis Hugh, 4,072,034, Cl. 72-56.000.

Santen, Sven; and Grip, Carl Erik, to SKF Industrial Trading and Development Co. B.V.; and Norrbottens Jarnverk AB. Method apparatus for increasing blast gas temperature in a shaft furnace. 4,072,502, Cl. 75-11.000.

Santen, Sven Oscar: *See*—
Perdahl, Orn Gunnar; and Santen, Sven Oscar, 4,072,504, Cl. 75-40.000.

Sanzenbacher, Hermann: *See*—
Heiser, Joachim; Hoheisel, Rainer; Flaschar, Heinz; Gand, Heinz; Kleinschmidt, Heinz; Braunlinger, Konrad; Sopha, Klaus; Schempp, Roland; and Sanzenbacher, Hermann, 4,072,169, Cl. 137-596.130.

Sarda, Jean-Paul; and Le Tirant, Pierre, to Institut Francais du Petrole; and Societe Europeene de Produits Refractaires. Propping agent and method of propping open fractures in the walls of a bored well. 4,072,193, Cl. 166-280.000.

Sasaki, Takashi: *See*—
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Co., Ltd., The. Tire pressure warning apparatus. 4,072,926, Cl. 340-58.000.
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Snyder, Richard V., to Harvard Industries, Inc. Feed forward passive coupling system and method. 4,072,913, Cl. 333-6.000.
Sobolev, Jury Vasilievich: *See—*
Zorev, Nikolai Nikolaevich; Astafiev, Anatoly Alexandrovich; Loboda, Alexandr Sergeevich; Savukov, Vladimir Pavlovich; Runov, Andrei Efimovich; Belov, Vladimir Alexandrovich; Sobolev, Jury Vasilievich; Sobolev, Valentin Vasilievich; Pavlov, Nikolai Mikhailovich; Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Balandin, Jury Fedorovich; Gorynin, Igor Vasilievich; Zvezdin, Jury Ivanovich; Ivanov, Kuzma Makeevich; Ignatov, Viktor Alexandrovich; and Emelyanenko, July Georgievich, 4,072,509, Cl. 75-124.000.
Sobolev, Valentin Vasilievich: *See—*
Zorev, Nikolai Nikolaevich; Astafiev, Anatoly Alexandrovich; Loboda, Alexandr Sergeevich; Savukov, Vladimir Pavlovich; Runov, Andrei Efimovich; Belov, Vladimir Alexandrovich; Sobolev, Jury Vasilievich; Sobolev, Valentin Vasilievich; Pavlov, Nikolai Mikhailovich; Paton, Boris Evgenievich; Medovar, Boris Izrailevich; Balandin, Jury Fedorovich; Gorynin, Igor Vasilievich; Zvezdin, Jury Ivanovich; Ivanov, Kuzma Makeevich; Ignatov, Viktor Alexandrovich; and Emelyanenko, July Georgievich, 4,072,509, Cl. 75-124.000.
Sochor, Jerzy R., to Spectra-Strip Corporation. Multiple conductor connector unit and cable assembly. 4,072,387, Cl. 339-91.00R.

Societa Italiana Vetro Siv S.p.A.: *See*—
Comastri, Mauro; and Ciarniello, Giorgio, 4,072,953, Cl. 343-713.000.
Comastri, Mauro; and Ciarniello, Giorgio, 4,072,954, Cl. 343-713.000.
Comastri, Mauro; and Ciarniello, Giorgio, 4,072,955, Cl. 343-713.000.

S.A. Texaco Belgium N.V.: *See*—
Hermans, Johny C., 4,072,633, Cl. 260-2.00N.

Societe d'Assistance Technique pour Produits Nestle S.A.: *See*—
Horisberger, Marc; and Olofsson, Mats, 4,072,666, Cl. 260-112.00R.
Margolis, Geoffrey; and Liu, Richard Tien-Szu, 4,072,761, Cl. 426-387.000.

Societe Europeene de Produits Refractaires: *See*—
Sarda, Jean-Paul; and Le Tirant, Pierre, 4,072,193, Cl. 166-280.000.

Societe Industrielle Bertrand Faure Brieres-les-Scelles: *See*—
Boisset, Bernard, 4,072,347, Cl. 297-385.000.

Societe Industrielle d'Etudes et de Realisations Scientifiques S.I.E.R.S.: *See*—
Banon, Gabriel J. C., 4,072,292, Cl. 251-331.000.

Societe Lignes Telegraphiques et Telephoniques: *See*—
Mahieu, Jean-Rene; and Robin, Michel, 4,072,901, Cl. 325-445.000.

Sodini, Giancarlo; and Canella, Marco, to Snamprogetti, S.p.A. Method for extracting phenols and oligosaccharides from vegetable tissues. 4,072,671, Cl. 260-123.500.

Solaron Corporation: *See*—
Lof, George, 4,072,142, Cl. 126-270.000.

Solvay & Cie: *See*—
Boulet, Jean-Claude; Walraevens, Rene; Bonnety, Gerard; Lolivier, Jacques; and Trouillet, Paul, 4,072,638, Cl. 260-2.5AP.

Sony Corporation: *See*—
Ishitani, Akiyasu, 4,072,975, Cl. 357-23.000.

Sopha, Klaus: *See*—
Heiser, Joachim; Hoheisel, Rainer; Flaschar, Heinz; Gand, Heinz; Kleinschmidt, Heinz; Braunlinger, Konrad; Sopha, Klaus; Schempp, Roland; and Sanzenbacher, Hermann, 4,072,169, Cl. 137-596.130.

Sosa, Jose M., to Instituto Venezolano de Investigaciones Cientificas. Copolymerization of vinyl monomers with cellulose and starch in copper ammonium solutions. 4,072,640, Cl. 260-17.4GC.

Soupal, Thomas R., to Midland-Ross Corporation. Combined hydraulic and vacuum booster. 4,072,085, Cl. 91-413.000.

Souquet, Jacques: *See*—
Sagner, Max; and Souquet, Jacques, 4,072,170, Cl. 137-599.000.

Southard, James S.: *See*—
Shallenberger, Larry R.; and Southard, James S., 4,072,078, Cl. 84-1.030.

Southeast SBIC, Inc.: *See*—
Reiniger, Haigh McDiarmid, 4,072,273, Cl. 241-24.000.

Spalla, Thomas W. Umpire's counter. 4,072,125, Cl. 116-120.000.

Spaziante, Placido M.: *See*—
De Nora, Oronzio; Nidola, Antonio; and Spaziante, Placido M., 4,072,586, Cl. 204-105.00M.

Specht, Thomas F.; Trodler, Juergen W.; and Vanecek, Pavel, to Union Special Corporation. Spindle brake mechanism for milling machines. 4,072,218, Cl. 188-75.000.

Spectra-Flux, Inc.: *See*—
Wasson, Ken G., 4,072,370, Cl. 308-10.000.

Spectra-Strip Corporation: *See*—
Sochor, Jerzy R., 4,072,387, Cl. 339-91.00R.

Spedale, Joseph J., to Chicago Switch, Inc. Slide switch type assembly having two part housing. 4,072,839, Cl. 200-295.000.

Sperber, Heinrich: *See*—
Halbritter, Guenter; Muehlthaler, Wolfgang; Sperber, Heinrich; Diem, Hans; Dudeck, Christian; and Lehmann, Gunter, 4,072,717, Cl. 260-603.00C.

Sperry Rand Corporation: *See*—
Campbell, Willis R.; and Waldrop, Thomas W., 4,072,095, Cl. 100-5.000.
Colby, Richard A., 4,072,237, Cl. 214-6.00B.
Heller, Larry E.; Shriver, Joe E.; and Lindblom, Curtis H., 4,072,002, Cl. 56-53.000.
Niemiec, Albin Joseph, 4,072,451, Cl. 418-178.000.
Ohnigian, Suran; and Seitchik, Jerold A., 4,073,012, Cl. 365-1.000.

Spevack, Jerome S., to Deuterium Corporation. Process feed and effluent treatment systems. 4,072,740, Cl. 423-563.000.

Spieth, Ernst K.: *See*—
Murso, Bernhard; and Riedmuller, Eberhard, 4,072,313, Cl. 273-105.200.

Spirig, Ernst. Method of and apparatus for detecting damage to a frangible object. 4,072,936, Cl. 340-274.00R.

Spohr, Reinhard: *See*—
Buschmann, Gerhard; and Spohr, Reinhard, 4,072,887, Cl. 318-675.000.

Spork, Helmut; Strasser, Rudolf; and Waas, Johann, to Wacker-Chemie GmbH. Process for recovering water-miscible solvents. 4,072,580, Cl. 203-47.000.

Spotholz, Clifford Henry: *See*—
Scarsella, Edward Louis; and Spotholz, Clifford Henry, 4,072,765, Cl. 426-596.000.

Springmann, Helmut, to Linde Aktiengesellschaft. Air-rectification process and apparatus. 4,072,023, Cl. 62-13.000.

Spruth, Wilhelm: *See*—
Bechtle, Bastian; Schuenemann, Claus; Skudelny, Gisbert; Spruth, Wilhelm; Weis, Helmut; and Zimmermann, Volker, 4,072,888, Cl. 318-685.000.

Stabilus GmbH: *See*—
Wirges, Winfried; and Freitag, Herbert, 4,072,288, Cl. 248-404.000.

Staebler, Paul J., to Caterpillar Tractor Co. Combined seal biasing spring and check valve for rotary mechanisms. 4,072,449, Cl. 418-87.000.

Staehlin, John H.: *See*—
Lloyd, Wayne B.; and Staehlin, John H., 4,072,064, Cl. 74-409.000.

Stainless Equipment Company: *See*—
Molitor, Victor D., 4,071,935, Cl. 29-157.30R.

Stalter, Joseph F., Jr., to Goodyear Tire & Rubber Company, The. Method and apparatus for building a closed torus tire. 4,072,550, Cl. 156-123.00R.

Standaart, Adrian W., deceased; and by Standaart, Josephine Benson, administratrix. Method of making electron guns for cathode ray tubes and the like. 4,071,932, Cl. 29-25.140.

Standaart, Josephine Benson, administratrix: *See*—
Standaart, Adrian W., deceased; and Standaart, Josephine Benson, administratrix, 4,071,932, Cl. 29-25.140.

Standard Oil Company, The: *See*—
White, James F.; Shaw, Wilfrid G.; and Applequist, Michael D., 4,072,708, Cl. 260-530.00N.

Standard Oil Company (Indiana): *See*—
Rogan, John B., 4,072,809, Cl. 526-136.000.

Stange, Klaus K., to Xerox Corporation. Apparatus for neutralizing and registering an electrostatically charged sheet. 4,073,001, Cl. 361-214.000.

Stanley Electric Co., Ltd.: *See*—
Teshima, Toru; Ehara, Takuhisa; and Nakanishi, Kaname, 4,072,005, Cl. 58-42.500.

Stant Manufacturing Company, Inc.: *See*—
Sloan, Paul H., Jr., 4,072,245, Cl. 220-295.000.

Star Seimitsu Kabushiki Kaisha: *See*—
Sato, Yukio; Itoh, Takeshi; and Izawa, Hiromi, 4,072,071, Cl. 82-2.00R.

Stauffer Chemical Company: *See*—
Chess, William B., 4,072,764, Cl. 426-558.000.
Pitt, Leland S.; and Large, George B., 4,072,745, Cl. 424-200.000.
Teach, Eugene G., 4,072,688, Cl. 260-306.70R.

Steiger Tractor Inc.: *See*—
Irwin, Gordon A., 4,072,487, Cl. 62-244.000.

Stein, Karl-Ulrich, to Siemens Aktiengesellschaft. Semiconductor component with dielectric carrier and its manufacture. 4,072,982, Cl. 357-49.000.

Steintveit, Georg: *See*—
Petterson, Stig Arvid; Lindstad, Tor; Dyvik, Froystein; and Steintveit, Georg, 4,072,503, Cl. 75-14.000.

Stember, Daniel L.: *See*—
Sweet, Robert P.; and Stember, Daniel L., 4,071,926, Cl. 24-136.00R.

Stephens, Leonard J.: *See*—
Schoeneweis, E. Frederick; and Stephens, Leonard J., 4,072,161, Cl. 137-68.00R.

Sterling Drug Inc.: *See*—
Daum, Sol Jacob, 4,072,692, Cl. 260-327.00M.
Lesher, George Y.; and Opalka, Chester J., Jr., 4,072,746, Cl. 424-263.000.

Stevens, Albert: *See*—
McMullan, James P.; and Stevens, Albert, 4,072,424, Cl. 356-208.000.

Stevens, Jack H.: *See*—
Lucero, Andres R.; Gilbert, Roy E.; and Stevens, Jack H., 4,072,930, Cl. 340-152.00T.

Stevens, Violete L.: *See*—
Hoornstra, Clayton W.; and Stevens, Violete L., 4,072,529, Cl. 96-115.00R.

Stewart, Sherman A.; and Snyder, Estel Ray, to Grefco, Inc. Construction material in sheet form and method of joining sheets edge-to-edge. 4,071,993, Cl. 52-309.500.

Stewart-Warner Corporation: *See*—
Brouwer, Frans, 4,072,301, Cl. 266-60.000.

Steyns, Emile B.; and Miller, Jerry H., to AFA Corporation, The. Hand operated sprayer with automatic container vent. 4,072,252, Cl. 222-341.000.

Stine, Laurence O.; and Ward, Dennis J., to UOP Inc. Simulated moving bed reaction process. 4,072,729, Cl. 260-671.00R.

Stoka, Roberto: *See*—
Burgdorf, Jochen; Eikenberg, Dieter; Stoka, Roberto; and Marianu, Vlod, 4,072,215, Cl. 188-72.400.

Stoll, Andre: *See*—
Ebnother, Anton; Bastian, Jean-Michel; Gadient, Fulvio; and Stoll, Andre, 4,072,756, Cl. 424-267.000.

Stone, Samuel M., to GTE Laboratories Incorporated. Laser beam intensity regulator. 4,072,858, Cl. 250-205.000.

Storace, Anthony, to Pitney-Bowes, Inc. Elastic-type clamp for a twin leaf spring scale. 4,072,202, Cl. 177-229.000.

Story, Joe A.: *See*—
Seegmiller, Wan; Young, Bruce O.; and Story, Joe A., 4,072,334, Cl. 293-71.00R.

Strait, Delbert W.: *See*—
Tift, Arlan William; and Strait, Delbert W., 4,072,335, Cl. 294-93.000.

Strang, Donald B.: *See*—
Bianco, Joseph F.; Senio, Nicholas; Hawes, Russell B.; and Strang, Donald B., 4,072,944, Cl. 343-7.0PF.

Strasser, Rudolf: *See—*
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Strini, Jean-Claude: *See—*
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Strizki, Richard A., to Transpo-Safety, Inc. Hinge plate for roadside post safety breakaway system for sign panels and the like. 4,071,970, Cl. 40-607.000.
Struers K/S: *See—*
Damgaard, Lavritz Gudmund, 4,072,598, Cl. 204-274.000.
Sturm, Budd Harvey; and Slam, Thomas James, to Goodyear Tire & Rubber Company, The. Purification of hydroquinone. 4,072,721, Cl. 260-621.00A.
Suchy, Voktor: *See—*
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Sud-Chemie AG: *See—*
Fahn, Rudolf; Brenner, Bernd; and Buckl, Hans, 4,072,538, Cl. 127-37.000.
Suda, Kyo; Takami, Katsumi; Shintani, Akira; and Hase, Shinobu, to Hitachi, Ltd. Method for controlling chemical vapor deposition. 4,072,767, Cl. 427-8.000.
Suda, Masashi; and Kubo, Shunichi, to Canon Kabushiki Kaisha. Image transfer device. 4,072,412, Cl. 355-3.0TR.
Sugi, Fumio: *See—*
Hattori, Tadashi; Takada, Akira; Nakase, Takamichi; and Sugi, Fumio, 4,072,137, Cl. 123-119.0DB.
Sugita, Hiroaki: *See—*
Inoue, Takehisa; Ogawa, Yutaka; Sugita, Hiroaki; and Watanabe, Namio, 4,072,217, Cl. 188-73.600.
Sugiyama, Akira; Yamamoto, Yoshikazu; and Yamada, Shiro, to Brother Kogyo Kabushiki Kaisha. Contour tracing sewing machine. 4,072,114, Cl. 112-121.120.
Sukhorukov, Vasily Vasilievich: *See—*
Rogachev, Viktor Igorevich; Sukhorukov, Vasily Vasilievich; and Shkatov, Petr Nikolaevich, 4,072,895, Cl. 324-238.000.
Sumitomo Chemical Company, Limited: *See—*
Oyama, Fusao; Murao, Sadatomi; and Okada, Shizuo, 4,072,678, Cl. 260-239.30A.
Sumitomo Durez Company, Ltd.: *See—*
Funabiki, Kyohei; and Tokunaga, Tetsuya, 4,072,531, Cl. 106-56.000.
Sumitomo Electric Industries, Ltd.: *See—*
Motoyoshi, Kenya; Kume, Masahiro; and Amano, Yoshinari, 4,072,515, Cl. 75-173.00A.
Summit Mining Ltd.: *See—*
Pentith, Gerald Richard Oldham, 4,072,355, Cl. 299-43.000.
Sumption, Richard F.; and Wallace, Charles H., to International Telephone & Telegraph Corporation. Method and apparatus for measuring carcasses. 4,071,957, Cl. 33-174.00L.
Sunaga, Hiromi: *See—*
Araki, Kunio; Sasaki, Takashi; Kasahara, Yuko; Yamashita, Yoshisada; Yotumoto, Keiichi; Sunaga, Hiromi; Tabei, Kiyoshi; Goto, Kazuo; Tajiri, Kunio; and Kittaka, Hirokama, 4,072,792, Cl. 428-246.000.
Suntech, Inc.: *See—*
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Bock, Erik, 4,071,939, Cl. 29-434.000.
Surgical Appliance Industries, Inc.: *See—*
Applegate, Leslie T., 4,072,308, Cl. 272-117.000.
Suzuki, Kunitaka: *See—*
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Suzuki, Masaaki: *See—*
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Suzuki, Masahiro. Magnesium composites and mixtures for hydrogen generation and method for manufacture thereof. 4,072,514, Cl. 75-168.00R.
Suzuki, Shigehiko: *See—*
Terazono, Narihiro; Kamaike, Hiroshi; and Suzuki, Shigehiko, 4,072,212, Cl. 187-29.00R.
Swanson, Eric R. LF/MF navigation system. 4,072,950, Cl. 343-105.00R.
Swartz, William H. Post hysterectomy fluid drainage tube. 4,072,153, Cl. 128-350.00R.
Sweet, LaVern E. Method for assemblying improved truss joist. 4,071,941, Cl. 29-468.000.
Sweet, Robert P.; and Stember, Daniel L., to D. B. Enterprises, Inc. Safety device for ladder climbers. 4,071,926, Cl. 24-136.00R.
Swenson, Richard F., Eimen, Shawn H.; and Gryga, John J., Jr., to Milsco Manufacturing Company. Seat supporting assembly of the resiliently loaded type. 4,072,287, Cl. 248-399.000.
Swift, Harold E.: *See—*
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Symaniec, Leonidas: *See—*
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Symons, Philip C.; and Amato, Carmelo J., to Energy Development Associates. Rechargeable electrical energy storage device. 4,072,540, Cl. 429-70.000.
Syntex (U.S.A.) Inc.: *See—*
Beard, Colin C.; Edwards, John A.; and Fried, John H., 4,072,696, Cl. 260-397.600.
Syrjanen, Ahti, to Yhtyneet Paperitehtaat Osakeyhtio Jylhavaara. Procedure and apparatus for preparing hot groundwood. 4,072,274, Cl. 241-28.000.
Szabo, Ferdinand W. Spring clamp for paper logs. 4,072,303, Cl. 269-131.000.
Szabo, Joseph F.: *See—*
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Szabo, Robert L., to General Dynamics Corporation. Apparatus and method for weld bonding. 4,072,843, Cl. 219-91.210.
T & H Mfg. Co., Inc.: *See—*
Carlson, Elmer Carl, 4,072,195, Cl. 172-15.000.
Tabei, Kiyoshi: *See—*
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Takamatsu, Akira: *See—*
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Takamitsu, Nagaaki: *See—*
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, 4,072,722, Cl. 260-621.00G.
Takashima, Hideo, to Canon Kabushiki Kaisha; and Canon Denshi Kabushiki Kaisha. Read-after-write head. 4,072,994, Cl. 360-124.000.
Takata, Yasuto: *See—*
Nakata, Tetsuya; Yamada, Nobuo; Hashimoto, Akira; Takata, Yasuto; and Bunnomori, Yukinari, 4,072,734, Cl. 260-873.000.
Takayama, Yoichiro, to Nippon Electric Co., Ltd. Equivalent load-pull characterization of microwave transistors. 4,072,897, Cl. 324-158.00T.
Takeda, Mitsuo: *See—*
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Tamao, Yoshikuni: *See—*
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Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,757, Cl. 424-267.000.
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Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuno; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,744, Cl. 424-177.000.
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Tanabe Seiyaku Co., Ltd.: *See—*
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Tanaka, Kazunobu; Kusumoto, Masahiko; and Watanabe, Shoji, to Daicel Ltd. Method of promoting the growth of plants. 4,071,975, Cl. 47-9.000.
Tanaka, Kojiro; and Yagi, Kenjiro, to Kabushiki Kaisha Daini Seikosha. Switching construction for a handy electronic device. 4,072,004, Cl. 58-23.00R.
Tanaka, Nobuyoshi; Takeda, Mitsuo; and Matsumoto, Kazuya, to Canon Kabushiki Kaisha. Apparatus for interferometrically measuring the physical properties of test object. 4,072,422, Cl. 356-108.000.
Tanaka, Tadashi; Okamoto, Akira; Kouno, Takashi; Kramer, William

E.; Hopkins, Richard H.; and Hoffman, Richard A., to Nippon Steel Corporation; and Westinghouse Electric Corporation. Resin composite for paint curable by high energy ionizing radiation. 4,072,657, Cl. 260-47.0UA.

Tanaka, Toshie, to Nifco Inc.; and Nichiei Bussan Co., Ltd. Pinching clip. 4,071,930, Cl. 24-252.00R.

Tanaka, Yukiyasu: *See*—
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Taner, M. Turhan; Sheriff, Robert E.; and Reeves, H. Neal, to Seiscom Delta Inc. Method for seismic exploration for enhanced results in simulated cylindrical or plane waves. 4,072,922, Cl. 340-15.5CP.

Tanso, Shiro: *See*—
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Tarasov, Mikhail Sergeevich: *See*—
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.

Tarzia, Giorgio, to Gruppo Lepetit S.p.A. Monoamino 2,4,5-trisubstituted oxazoles. 4,072,689, Cl. 260-307.00R.

Taylor, John S.; and Grantham, William G., to FMC Corporation. Dimensionally stable, nitrocellulose coated cellophane. 4,072,785, Cl. 428-536.000.

Taylor, Raymond C.: *See*—
Richards, Frank P.; and Taylor, Raymond C., 4,072,226, Cl. 198-345.000.

Teach, Eugene G., to Stauffer Chemical Company. Haloacyl and thiohaloacyl aryl-substituted oxazolidines and thiazolidines-herbicidal antidotes. 4,072,688, Cl. 260-306.70R.

Technicon Instruments Corporation: *See*—
Coyne, Lawrence J.; George, Wilberdan V.; and Groner, Warren, 4,072,421, Cl. 356-39.000.

Teibow Company Limited: *See*—
Otsuka, Katsumi, 4,072,430, Cl. 401-265.000.

Teich, Wolfgang: *See*—
Korrenn, Heinz; Teich, Wolfgang; and Heimrich, Helmut, 4,072,372, Cl. 308-72.000.

Teijin Seiki Company Limited: *See*—
Mino, Kazuhiko, 4,072,003, Cl. 57-58.520.

Tekken Construction Co. Ltd.: *See*—
Yamazaki, Hironobu, 4,072,021, Cl. 61-42.000.

Teledyne Industries, Inc.: *See*—
Megy, Joseph Allen, 4,072,506, Cl. 75-63.000.

Telesio, George O. Scoring tool for frankfurters. 4,071,950, Cl. 30-124.000.

Tension Envelope Corporation: *See*—
Kranz, Richard, 4,072,264, Cl. 229-72.000.

Tepper, Richard M.: *See*—
Sickles, James E.; and Tepper, Richard M., 4,073,002, Cl. 361-227.000.

Tepper, Sidney A.: *See*—
Rosen, Beverly; and Tepper, Sidney A., 4,072,314, Cl. 273-161.000.

Terajima, Kazuki: *See*—
Tomita, Shigeru; Matsuda, Yoshindo; Terajima, Kazuki; and Abe, Keiji, 4,072,794, Cl. 428-378.000.

Terazono, Narihiro; Kamaike, Hiroshi; and Suzuki, Shigehiko, to Mitsubishi Denki Kabushiki Kaisha. Elevator speed control system. 4,072,212, Cl. 187-29.00R.

Terman, Lewis Madison: *See*—
Heller, Lawrence Griffith; and Terman, Lewis Madison, 4,072,939, Cl. 340-347.0AD.

Ter-Minassian, Leon, to Agence Nationale de Valorisation de la Recherche (ANVAR). Isothermal calorimetry process and calorimeter for carrying out the process. 4,072,050, Cl. 73-190.00R.

Terrell Machine Company, The: *See*—
Ferguson, Richard; and Troutman, Kenneth W., 4,072,240, Cl. 214-313.000.

Terzian, Rouben T.; and Brand, Derek A., to Marvin Glass & Associates. Paint roller. 4,072,429, Cl. 401-146.000.

Teshima, Toru; Ehara, Takuhisa; and Nakanishi, Kaname, to Stanley Electric Co., Ltd. Clock device. 4,072,005, Cl. 58-42.500.

Texaco Inc.: *See*—
Kudchadker, Mohan V.; and Weiss, Walter J., 4,072,192, Cl. 166-273.000.
Naizer, Kenneth C.; and DuBose, Jesse K., 4,072,043, Cl. 73-23.000.

Texas Instruments Incorporated: *See*—
Bate, Robert T.; and Caywood, John Millard, 4,072,977, Cl. 357-24.000.
Black, Christopher T.; and Lear, Anthony, 4,072,981, Cl. 357-46.000.
Buss, Dennis Darcy; Emmons, Stephen P.; and Barton, James Brockman, 4,072,978, Cl. 357-24.000.
Kitagawa, Norihisa; and White, Lionel Stuart, Jr., 4,072,932, Cl. 365-233.000.
Tubbs, Graham S., 4,073,006, Cl. 364-200.000.

Textron Inc.: *See*—
Waight, William J.; and Roche, Stanley E., 4,072,431, Cl. 403-158.000.

Tezuka, Tohru: *See*—
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,743, Cl. 424-177.000.
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuno; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,744, Cl. 424-177.000.
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,757, Cl. 424-267.000.

Thelander, Paul F., to Automated Medical Systems, Inc. Method of obtaining a precipitate of metallic ions from solutions containing low concentrations of metal salts. 4,072,605, Cl. 210-50.000.

Thermon Manufacturing Company: *See*—
Johnson, Ben C.; Thornton, J. Scott; Glowe, Donald E.; Cassidy, Patrick E.; and Anderson, Robert E., 4,072,848, Cl. 219-528.000.

Thibault, Jean-Jacques, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Regeneration-type cryopump. 4,072,025, Cl. 62-55.500.

Thielen, James E., to Minnesota Mining and Manufacturing Company. Griddle cleaning pad holder. 4,071,983, Cl. 51-393.000.

Thomas, Donald Beuford: *See*—
Croome, Ronald John; and Thomas, Donald Beuford, 4,072,624, Cl. 252-301.350.

Thome, Paul, to Mecazo. Rotative welding gun. 4,072,828, Cl. 219-137.310.

Thompson, John Fred: *See*—
Ross, Cecil Jack; and Thompson, John Fred, 4,071,949, Cl. 29-818.000.

Thompson, John Stewart: *See*—
Gitlin, Richard Dennis; and Thompson, John Stewart, 4,072,830, Cl. 179-170.200.

Thomson-CSF: *See*—
Couderc, Georges; Payen, Claude Andre; Dansac, Jean; and Symaniec, Leonidas, 4,072,861, Cl. 250-233.000.

Thomson-CSF Laboratories, Inc.: *See*—
Kaiser, Arthur, 4,072,984, Cl. 358-31.000.

Thornton, J. Scott: *See*—
Johnson, Ben C.; Thornton, J. Scott; Glowe, Donald E.; Cassidy, Patrick E.; and Anderson, Robert E., 4,072,848, Cl. 219-528.000.

Thurston, Harold H. Shiftable anchor assembly. 4,072,113, Cl. 105-484.000.

Tift, Arlan William; and Strait, Delbert W. Lifting device. 4,072,335, Cl. 294-93.000.

Timofeev, Vladimir Vasilievich: *See*—
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.

Timsons Limited: *See*—
Miles, Geoffrey Robert Henry, 4,072,076, Cl. 83-300.000.

Ting, Vincent Wen-Hwa, to SCM Corporation. U.V. curable poly(ester-urethane) polyacrylate polymers and wet look coatings therefrom. 4,072,770, Cl. 427-54.000.

Tinker, Harold Burnham, to Monsanto Company. Production of lactic acid. 4,072,709, Cl. 260-535.00R.

Tiraspolsky, Wladimir; and Rouviere, Roger Francois. Valve apparatus for deep drilling. 4,072,166, Cl. 137-496.000.

Tischlinger, Edward A. Nose cap and diaphragm assembly for injector. 4,072,149, Cl. 128-218.0NV.

Tither, Geoffrey: *See*—
Coldren, Arthur P.; Tither, Geoffrey; and Doane, Douglas V., 4,072,543, Cl. 148-12.00F.

Togo, Kazushi; Tamura, Fumihide; Yasuda, Naohiko; Ichikawa, Takehiko; Sano, Konosuke; Matsuda, Keizo; and Mitsugi, Koji, to Ajinomoto Co., Inc. Process for producing 2-amino-(2)-thiazoline-4-carboxylic acid. 4,072,687, Cl. 260-306.70T.

Tohyama, Yoshikuni: *See*—
Kitajima, Tadayuki; and Tohyama, Yoshikuni, 4,072,211, Cl. 185-40.00R.

Tojyo, Tsutomu: *See*—
Uetake, Toshifumi; and Tojyo, Tsutomu, 4,072,408, Cl. 350-255.000.

Tokico Ltd.: *See*—
Haraikawa, Tetsuo; and Karasudani, Yasuo, 4,072,214, Cl. 188-72.400.
Haraikawa, Tetsuo, 4,072,216, Cl. 188-73.300.

Tokina Optical Co., Ltd.: *See*—
Ozeki, Banri, 4,072,405, Cl. 350-173.000.

Tokunaga, Tetsuya: *See*—
Funabiki, Kyohei; and Tokunaga, Tetsuya, 4,072,531, Cl. 106-56.000.
Tokyo Denryoku Kabushiki Kaisha: *See*—
Andow, Fumio; Matsushima, Tetsuo; and Iwasaki, Minoru, 4,073,008, Cl. 364-602.000.
Andow, Fumio; Matsushima, Tetsuo; and Iwasaki, Minoru, 4,073,009, Cl. 364-602.000.
Tokyo Fabric Kogyo Kabushiki Kaisha: *See*—
Shimizu, Soichiro, 4,072,022, Cl. 61-48.000.
Tokyo Shibaura Denki Kabushiki Kaisha: *See*—
Andow, Fumio; Matsushima, Tetsuo; and Iwasaki, Minoru, 4,073,008, Cl. 364-602.000.
Andow, Fumio; Matsushima, Tetsuo; and Iwasaki, Minoru, 4,073,009, Cl. 364-602.000.
Tomioka, Ichiro: *See*—
Seki, Kiyoshi; Tomioka, Ichiro; and Sawa, Yoshihiko, 4,072,016, Cl. 61-35.000.
Tomita, Shigeru; Matsuda, Yoshindo; Terajima, Kazuki; and Abe, Keiji, to Agency of Industrial Science and Technology of Japan. Oil adsorbent and a method of producing same. 4,072,794, Cl. 428-378.000.
Tomoyuki, Nogami, to Toyota Jidosha Kogyo Kabushiki Kaisha. Inertia-controlled valve for vehicle braking systems. 4,072,363, Cl. 303-24.00C.
Tonhauser, Harry L. Collapsible display elements. 4,071,969, Cl. 40-610.000.
Tonomura, Shinji: *See*—
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,743, Cl. 424-177.000.
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuno; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,744, Cl. 424-177.000.
Okamoto, Shosuke; Hijikata, Akiko; Kikumoto, Ryoji; Tamao, Yoshikuni; Ohkubo, Kazuo; Tezuka, Tohru; and Tonomura, Shinji, 4,072,757, Cl. 424-267.000.
Topolyansky, Jury Arnoldovich: *See*—
Kovanov, Pavel Vasilievich; Torochkov, Ivan Mikhailovich; Zonenko, Ivan Timofeevich; Alexandrov, Adolf Moritsovich; Aglitsky, Vladimir Efimovich; Tsimbler, Jury Abramovich; Kantor, Ilya Solomonovich; Topolyansky, Jury Arnoldovich; and Lurie, Mikhail Vladimirovich, 4,072,109, Cl. 104-138.00R.
Tornas, Olle. Device for increasing and standardizing the scatter of shotguns, particularly for skeet shooting. 4,071,971, Cl. 42-79.000.
Torney, Harry Lester: *See*—
Weiss, Stefan Adam; Torney, Harry Lester; and Caldwell, William Joseph, 4,072,565, Cl. 195-1.100.
Torochkov, Ivan Mikhailovich: *See*—
Kovanov, Pavel Vasilievich; Torochkov, Ivan Mikhailovich; Zonenko, Ivan Timofeevich; Alexandrov, Adolf Moritsovich; Aglitsky, Vladimir Efimovich; Tsimbler, Jury Abramovich; Kantor, Ilya Solomonovich; Topolyansky, Jury Arnoldovich; and Lurie, Mikhail Vladimirovich, 4,072,109, Cl. 104-138.00R.
Toulios, Peter P.: *See*—
Knox, Robert M.; and Toulios, Peter P., 4,072,902, Cl. 325-446.000.
Towne, Gary L.; Depew, Noel F.; and Fowler, Charles A., to NCR Corporation. Electric power distributing apparatus. 4,072,379, Cl. 339-17.0LM.
Townsend Engineering Company: *See*—
Smith, David W., 4,071,923, Cl. 17-21.000.
Toyo Kogyo Co., Ltd.: *See*—
Kubo, Yoshiki, 4,071,980, Cl. 51-165.870.
Toyo Rubber Industry Co., Ltd., The: *See*—
Shimahara, Yoichi; and Shimada, Takashi, 4,072,926, Cl. 340-58.000.
Toyobo Co., Ltd.: *See*—
Konomi, Tuyoshi; Endo, Seiji; Yamaguchi, Masayasu; and Katsuo, Kenichi, 4,072,664, Cl. 260-78.00R.
Toyoda-Koki Kabushiki-Kaisha: *See*—
Nomura, Kenji; Yoshioka, Kengo; and Goto, Toshihiro, 4,072,236, Cl. 214-1.0BB.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
Hattori, Tadashi; Takada, Akira; Nakase, Takamichi; and Sugi, Fumio, 4,072,137, Cl. 123-119.0DB.
Kawakami, Susumu, 4,072,012, Cl. 60-562.000.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,072,134, Cl. 123-75.00B.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,072,135, Cl. 123-75.00B.
Noguchi, Masaaki; Tanaka, Yukiyasu; Sekiya, Setsuro; and Motosugi, Katsuhiko, 4,072,136, Cl. 123-75.00B.
Shimokawa, Toshiaki; and Suzuki, Kunitaka, 4,072,323, Cl. 280-745.000.
Tomoyuki, Nogami, 4,072,363, Cl. 303-24.00C.
Traber, Fritz. Demountable frame and panel. 4,071,990, Cl. 52-155.000.
Transpo-Safety, Inc.: *See*—
Strizki, Richard A., 4,071,970, Cl. 40-607.000.
Treadwell, Richard Julian, to RCA Corporation. Brushless phase locked servo drive. 4,072,884, Cl. 318-314.000.
Trebinger, Karl: *See*—
Reinhardt, Helmut; Trebinger, Karl; and Kallrath, Gottfried, 4,072,796, Cl. 428-405.000.
Tripp, Ralph N., Jr. Thermal retaining garden water blanket. 4,071,974, Cl. 47-2.000.
Trodler, Juergen W.: *See*—
Specht, Thomas F.; Trodler, Juergen W.; and Vanecek, Pavel, 4,072,218, Cl. 188-75.000.
Trouillet, Paul: *See*—
Boulet, Jean-Claude; Walraevens, Rene; Bonnety, Gerard; Lolivier, Jacques; and Trouillet, Paul, 4,072,638, Cl. 260-2.5AP.
Troutman, Kenneth W.: *See*—
Ferguson, Richard; and Troutman, Kenneth W., 4,072,240, Cl. 214-313.000.
True, Howard D. F., Jr., to General Electric Company. Side fastener clip for a plate-like member. 4,072,374, Cl. 312-214.000.
TRW Inc.: *See*—
Carlson, Robert E., 4,072,450, Cl. 418-133.000.
Powers, Thomas R., 4,072,438, Cl. 408-59.000.
Tsimbler, Jury Abramovich: *See*—
Kovanov, Pavel Vasilievich; Torochkov, Ivan Mikhailovich; Zonenko, Ivan Timofeevich; Alexandrov, Adolf Moritsovich; Aglitsky, Vladimir Efimovich; Tsimbler, Jury Abramovich; Kantor, Ilya Solomonovich; Topolyansky, Jury Arnoldovich; and Lurie, Mikhail Vladimirovich, 4,072,109, Cl. 104-138.00R.
Tsuchiya, Hiroyoshi: *See*—
Hayami, Heijiro; Tsuchiya, Hiroyoshi; Yoshida, Kunio; Tsuda, Yukifumi; and Kanno, Yoshimitsu, 4,072,958, Cl. 346-140.00R.
Tsuda, Yukifumi: *See*—
Hayami, Heijiro; Tsuchiya, Hiroyoshi; Yoshida, Kunio; Tsuda, Yukifumi; and Kanno, Yoshimitsu, 4,072,958, Cl. 346-140.00R.
Tsujihara, Toshio; Saito, Humitoshi; and Kitamori, Teruaki, to Matsushita Electric Industrial Co., Ltd. Turntable direct-drive system. 4,072,315, Cl. 274-1.00E.
Tsushima, Sakae: *See*—
Watanabe, Itaru; Yamakoshi, Yasumichi; Miyauchi, Hirotsugu; Tsushima, Sakae; and Fukumoto, Mitsunobu, 4,072,793, Cl. 428-255.000.
Tsuto, Keiichi; Majima, Kanji; and Hirasaka, Toshio, to Kao Soap Co., Ltd. Gas feeder for sulfonation apparatus. 4,072,470, Cl. 23-284.000.
Tubbs, Graham S., to Texas Instruments Incorporated. Digital processor system with simultaneous branch and OP code function. 4,073,006, Cl. 364-200.000.
Tubbs, Myron W.: *See*—
Decker, John W.; and Tubbs, Myron W., 4,072,316, Cl. 277-235.00B.
Turin, Michel J.: *See*—
Fauran, Claude P.; Turin, Michel J.; Imbert, Thierry F.; Raynaud, Guy M.; and Dorme, Nicole A. M., 4,072,682, Cl. 260-268.0BC.
Turner, Garland Linwood: *See*—
Cooksey, James Judson; and Turner, Garland Linwood, 4,072,457, Cl. 425-192.00S.
UBE Industries, Ltd.: *See*—
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, 4,072,722, Cl. 260-621.00G.
Uchida, Minoru: *See*—
Nakagawa, Kazuyuki; Uchida, Minoru; and Oka, Hiroaki, 4,072,683, Cl. 260-288.00R.
Uchio, Hiroshi: *See*—
Okamoto, Kazuo; and Uchio, Hiroshi, 4,072,658, Cl. 260-49.000.
Uetake, Toshifumi; and Tojyo, Tsutomu, to Olympus Optical Co., Ltd. Lens mount for a microscope objective. 4,072,408, Cl. 350-255.000.
Ugo, John Walter, to Uniroyal, Inc. Sensor shoe for tire grinding machine. 4,071,979, Cl. 51-106.00R.
Uitvlugt, Martin W.: *See*—
Larson, Gerald L.; Pi, Alberto; and Uitvlugt, Martin W., 4,072,206, Cl. 180-105.00E.
Ullmann, Werner; and Buhler, Ernst, to A.G. fur industrielle Elektronik. Electro-erosion machine tool and a pulse generator for use in such a machine tool. 4,072,842, Cl. 219-69.00C.
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, to UBE Industries, Ltd. Process for preparing dihydric phenol derivatives. 4,072,722, Cl. 260-621.00G.
Umezawa, Hamao; Takeuchi, Tomio; Takamatsu, Akira; and Mori, Shunro, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Pharmaceutical method for the therapy of immune diseases. 4,072,753, Cl. 424-308.000.
Unimax Switch Limited: *See*—
Corfield, John Courtney, 4,072,841, Cl. 200-332.000.
Union Carbide Corporation: *See*—
D'Silva, Themistocles D. J., 4,072,750, Cl. 424-276.000.
D'Silva, Themistocles Damasceno Joaquim, 4,072,751, Cl. 424-298.000.
Union Special Corporation: *See*—
Nagy, Joseph, 4,072,116, Cl. 112-286.000.
Specht, Thomas F.; Trodler, Juergen W.; and Vanecek, Pavel, 4,072,218, Cl. 188-75.000.
Uniroyal, Inc.: *See*—
Ugo, John Walter, 4,071,979, Cl. 51-106.00R.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See*—
Fulker, John Leslie; Hall, David John; and Lock, Robert Christopher, 4,072,282, Cl. 244-35.00R.
United States of America
Agriculture: *See*—
Betschart, Antoinette A., 4,072,669, Cl. 260-123.500.
Cirino, Vidabelle O.; and Rowland, Stanley P., 4,072,784, Cl. 428-507.000.
Folk, Craig L., 4,071,925, Cl. 19-296.000.

Luddy, Francis E.; Hampson, James W.; Herb, Samuel F.; and Rothbart, Herbert L., 4,072,766, Cl. 426-607.000.

Army: *See—*
Demko, Paul S., 4,072,952, Cl. 343-700.0MS.
Drews, William A.; Padgett, Charles L.; and Pinna, Ray Anthony, 4,072,948, Cl. 343-18.00C.
Guttman, Thomas, 4,072,425, Cl. 356-209.000.
Huskins, Chester W., 4,072,702, Cl. 260-453.0AB.
Lewis, William; Weldon, Peter J.; Hagedorn, Henry, Jr.; Hayes, Thomas E.; and Israels, Sylvan H., 4,072,108, Cl. 102-70.20R.
Miller, Miles C., 4,072,049, Cl. 73-147.000.
Miller, Walter E., Jr.; Sitton, Robert L.; and Blackmon, Anthony D., 4,072,281, Cl. 244-3.160.
Ricks, Earl C., 4,072,787, Cl. 428-594.000.
Saxe, Frederick E.; and Einbinder, Seymour K., 4,072,107, Cl. 102-4.000.
Youngren, Fred R., 4,072,774, Cl. 427-294.000.

Energy: *See—*
Fraas, Arthur P., 4,072,183, Cl. 165-11.000.
Knight, Charles E., Jr.; Kovach, Louis; and Hurst, Jonn S., 4,072,084, Cl. 90-11.00A.
Quinby, Thomas C., 4,072,501, Cl. 75-.5BC.

Interior: *See—*
Heinen, Harold J.; Peterson, David G.; and Lindstrom, Roald E., 4,072,587, Cl. 204-110.000.
Morrell, Roger J.; Gunn, Jerome A.; and Wilson, Richard J., 4,072,015, Cl. 61-35.000.
Sisler, Frederick D.; and Senftle, Frank E., 4,072,798, Cl. 429-2.000.

National Aeronautics and Space Administration; administrator; with respect to an invention of:
Phillips, Wayne M. High temperature resistant cermet and ceramic compositions. 4,072,532, Cl. 106-65.000.

Navy: *See—*
Alig, Craig S., 4,072,613, Cl. 210-198.00R.
Casasent, David Paul; and Psaltis, Demetri, 4,073,010, Cl. 364-822.000.
Casner, Paul G.; and McDevitt, Edward J., 4,072,904, Cl. 328-39.000.
Finn, Arthur Francis, 4,072,070, Cl. 81-71.000.
Kaloi, Cyril M., 4,072,951, Cl. 343-700.0MS.
Mohon, Windell N., 4,072,395, Cl. 350-33.000.
Provencher, Joseph H., 4,072,956, Cl. 343-844.000.
Van Brunt, LeRoy B., 4,072,949, Cl. 343-18.00E.

U.S. Philips Corporation: *See—*
Kok, Cornelis Hendrik, 4,072,991, Cl. 360-92.000.
Mitchell, Richard F., 4,072,915, Cl. 333-72.000.

University of California, The Regents of the: *See—*
Hanson, Donald N.; and Wilke, Charles R., 4,072,477, Cl. 55-10.000.

University of Missouri, The Curators of the: *See—*
Clark, George B.; and Lehnhoff, Terry F., 4,072,353, Cl. 299-22.000.

University of Sussex, The: *See—*
Jayawant, Bhalchandra Vinayak, 4,072,110, Cl. 104-148.0MS.

UOP Inc.: *See—*
Carson, Don B., 4,072,579, Cl. 203-11.000.
Douglas, Walter M., 4,072,630, Cl. 252-430.000.
Hayes, John C., 4,072,602, Cl. 208-138.000.
Rausch, Richard E., 4,072,731, Cl. 260-673.500.
Stine, Laurence O.; and Ward, Dennis J., 4,072,729, Cl. 260-671.00R.
Ward, Dennis J., 4,072,604, Cl. 208-341.000.
Winter, George R., III, 4,072,730, Cl. 260-671.00R.

Upjohn Company, The: *See—*
Hylton, Thomas A.; and Shenton, Francis L., 4,072,698, Cl. 260-465.00E.
Moon, Malcolm W.; and Kornis, Gabriel, 4,072,498, Cl. 71-92.000.
Onder, Besir K., 4,072,665, Cl. 260-78.00R.
Schlieckmann, Alfred, 4,072,458, Cl. 425-451.600.

Uraneck, Carl A.; and Brown, James D., to Phillips Petroleum Company. Molecular weight reduction of unsaturated polymers. 4,072,807, Cl. 526-48.100.

Urano, Toshihiro: *See—*
Kokaji, Norio; and Urano, Toshihiro, 4,072,957, Cl. 346-74.100.

Urbani, Larry E. Wax container material. 4,071,943, Cl. 29-525.000.

Usui, Eiki: *See—*
Murakado, Hiroshi; Nakata, Kazuhiro; Usui, Eiki; Tamiya, Tetsuo; Chikuda, Masahiro; Kitao, Yoshinobu; and Fujiwara, Akira, 4,072,542, Cl. 148-11.50A.

Utility Products Co.: *See—*
Van de Loo, Harley J.; and Ziegler, Hans J., 4,072,377, Cl. 339-17.00F.

Uyeda, Tim: *See—*
Phillips, Peter J., 4,072,032, Cl. 70-339.000.

Vale, Wylie W., Jr.: *See—*
Amoss, Max S.; Monahan, Michael W.; and Vale, Wylie W., Jr., 4,072,668, Cl. 260-112.5LH.

Van Anrooy, John A., to Lambert Brake Corporation. Trailer brake system. 4,072,362, Cl. 303-7.000.

Van Brunt, LeRoy B., to United States of America, Navy. Range gate walk-off of compressive radar. 4,072,949, Cl. 343-18.00E.

Van de Loo, Harley J.; and Ziegler, Hans J., to Utility Products Co. Terminal block. 4,072,377, Cl. 339-17.00F.

Vandeputte, Camille Angelina: *See—*
Pollet, Robert Joseph; Sels, Francis Jeanne; and Vandeputte, Camille Angelina, 4,072,523, Cl. 96-22.000.
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van der Lely, Cornelis. Cultivators. 4,072,196, Cl. 172-49.000.

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Vandersons Corporation: *See—*
Fletcher, C. Hugh; Bogdan, Raymond G.; Wright, Robert W.; and Cheuvront, Robert M., 4,072,103, Cl. 101-151.000.

Vanderspurt, Thomas H., to Celanese Corporation. Silver-cadmium-zinc alloy catalyst for hydrogenation of acrolein to allyl alcohol. 4,072,727, Cl. 260-638.00B.

Vandervell Products Limited: *See—*
Hill, Joseph Henry; and Green, David Frederick, 4,072,371, Cl. 308-56.000.

Vanecek, Pavel: *See—*
Specht, Thomas F.; Trodler, Juergen W.; and Vanecek, Pavel, 4,072,218, Cl. 188-75.000.

Varadyne Industries, Inc.: *See—*
Zillman, Jack H., 4,072,780, Cl. 428-325.000.

Varian Associates, Inc.: *See—*
Christen, Urs; and Guidinger, Dewayne C., 4,072,846, Cl. 219-497.000.
Lee, Arnold St. Jacques, 4,072,056, Cl. 73-706.000.

Varjushenkov, Anatoly Mikhailovich: *See—*
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.

Vaudaux, Francis, to Garcia Corporation, The. Lost motion anchor for a self-restoring ski binding. 4,072,321, Cl. 280-637.000.

Vaughan, Warren R., to Allis-Chalmers Corporation. Self-unloading ship with two tunnel belts and a central reclaimer. 4,072,238, Cl. 214-15.00E.

Vellins, Cyril Eric; and Dixon, Leonard Fox, to L. B. Holliday & Company Limited. Transfer printing. 4,072,462, Cl. 8-2.50A.

Velo-Bind, Inc.: *See—*
Groswith, Charles T., III; and Woodley, Ralph M., 4,072,326, Cl. 281-29.000.

Velsicol Chemical Corporation: *See—*
Anderson, Arnold L., 4,072,652, Cl. 260-45.75B.

Verbanac, Frank: *See—*
Short, Rolland W. P.; and Verbanac, Frank, 4,072,535, Cl. 106-210.000.

Vereinigte Osterreichische Eisen- und Stahlwerke Alpine Montan Aktiengesellschaft: *See—*
Riegler, Ernst; and Schmidt, Manfred, 4,072,302, Cl. 266-245.000.

Veyhl-Produktion KG: *See—*
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Veyhl, Wolf, to Veyhl-Produktion KG. Three-tube corner joint. 4,072,433, Cl. 403-172.000.

Victor Company of Japan, Ltd.: *See—*
Haramoto, Yutaka; Nisikawa, Kazunori; and Yamazaki, Masami, 4,072,914, Cl. 333-14.000.
Sato, Manabu; and Matumoto, Shigeru, 4,072,988, Cl. 360-96.000.

Victor Comptometer Corporation: *See—*
Marsman, John W.; and Heaton, G. Norman, 4,072,232, Cl. 206-602.000.

Vielhaber, Edward T.: *See—*
Creekmore, Mark D.; Vielhaber, Edward T.; and Carter, Russell P., Jr., 4,072,790, Cl. 428-220.000.

Vihorlat, narodny podnik: *See—*
Kostura, Michal; Pandula, Jan; Harmansky, Absolon; Smiga, Slavomir; and Kepic, Stefan, 4,072,181, Cl. 164-154.000.

Vivat, Michel: *See—*
Buendia, Jean; Vivat, Michel; and Schalbar, Jeanine, 4,072,755, Cl. 424-312.000.

Vodicka, Ludek; Peka, Ivo; and Suchy, Voktor, to Vysoka skola chemicko-technologicka. Method for recovering palladium from spent palladium catalysts. 4,072,508, Cl. 75-121.000.

Voges, Dieter; Baer, Karl; Boudier, Juergen; Winderl, Siegfried; and Hoffmann, Herwig, to BASF Aktiengesellschaft. Hydrogenation of acetylene alcohols. 4,072,714, Cl. 260-584.00R.

Vogiatzis, Constantinos. Footwear fastening system. 4,071,964, Cl. 36-50.000.

Vogt, Herwart Curt; Parekh, Manher; Cenker, Moses; and Patton, John Thomas, Jr., to BASF Wyandotte Corporation. Vanadyl alcoholate, organic titanate, polyhydric alcohol compositions as esterification/-transesterification catalysts. 4,072,631, Cl. 252-431.00R.

Volckmann, Klaus: *See—*
Oltmanns, Heinrich; and Volckmann, Klaus, 4,072,453, Cl. 425-62.000.

Volman, Mikhail Yakovlevich; Grinshtein, Vladimir Yakovlevich; Zhukov, Mikhail Leonidovich; Kuchuk, Ivan Anatolievich; and

Polovinkin, Evgeny Petrovich. Outdoor high-voltage switchgear assembly. 4,072,999, Cl. 361-333.000.
Volpin, Pavel Ilich: *See—*
Brusako, Jury Ivanovich; Rzhavin, Sergei Alexandrovich; Kiselev, Vasily Pavlovich; Tarasov, Mikhail Sergeevich; Rapoport, Vladimir Mendeleevich; Timofeev, Vladimir Vasilievich; Ragulina, Raisa Ivanovna; Alivoivodich, Miro Khristoforovich; Kucherenko, Anatoly Gavrilovich; Varjushenkov, Anatoly Mikhailovich; Isaeva, Elena Pavlovna; Berezhnoi, Ivan Arkhipovich; Rumyantsev, Vasily Petrovich; Shpak, Grigory Safronovich; Guz, Dmitry Semenovich; Ilinkov, Dmitry Vladimirovich; Volpin, Pavel Ilich; Avdeev, Mikhail Pavlovich; Artemenko, Stanislav Arsentievich; and Khrennikova, Ljudmila Pavlovna, 4,072,512, Cl. 75-148.000.
von Gutfeld, Robert Jacob, to International Business Machines Corporation. Multilayered slant-angle thin film energy detector. 4,072,864, Cl. 250-338.000.
Voss, Hubert E.; and Roth, Ronald W., to Irrigation Engineering & Specialties. Self-cleaning ball valve. 4,072,271, Cl. 239-541.000.
Vysoka skola chemicko-technologicka: *See—*
Vodicka, Ludek; Peka, Ivo; and Suchy, Voktor, 4,072,508, Cl. 75-121.000.
Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi: *See—*
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W. C. Heraeus GmbH: *See—*
Eligehausen, Hans, 4,072,856, Cl. 362-2.000.
W. H. Booth & Co. Limited: *See—*
Hoult, Frederick Herbert, 4,072,180, Cl. 164-130.000.
W. P. Hickman Company, Inc.: *See—*
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W. R. Grace & Co.: *See—*
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W. R. Weaver: *See—*
Ross, Cecil Jack; and Thompson, John Fred, 4,071,949, Cl. 29-818.000.
Ross, Cecil Jack, 4,072,396, Cl. 350-46.000.
Waas, Johann: *See—*
Spork, Helmut; Strasser, Rudolf; and Waas, Johann, 4,072,580, Cl. 203-47.000.
WABCO Westinghouse GmbH: *See—*
Gudat, Wolfgang; and Ruhnau, Gerhard, 4,072,364, Cl. 303-95.000.
Wacker-Chemie GmbH: *See—*
Louis, Eckhart; Dorsch, Norman; and Wohlfarth, Ernst, 4,072,655, Cl. 260-46.50G.
Spork, Helmut; Strasser, Rudolf; and Waas, Johann, 4,072,580, Cl. 203-47.000.
Wadleigh, Edward R. Turn-off interlock for tape and film machines. 4,072,879, Cl. 318-57.000.
Wagner, David Prugh: *See—*
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Wagner, Norman J., to Calgon Corporation. Dual impregnated activated carbon for improved removal of malodorous sulfur compounds. 4,072,480, Cl. 55-73.000.
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Sinha, Rabindra Kumar; Wagner, Norman J.; and Joyce, Ronald S., 4,072,479, Cl. 55-73.000.
Wagner, Theodor, to C.C. Egelhaaf, Firma. Arrangement for producing selvage in woven fabrics. 4,072,174, Cl. 139-54.000.
Waight, William J.; and Roche, Stanley E., to Textron Inc. Antirotation clip. 4,072,431, Cl. 403-158.000.
Wainco Products Limited: *See—*
Dove, Michael David, 4,072,260, Cl. 226-173.000.
Waite, John Stuart, to GKN Floform Limited. Method of making semi-conductor mounts. 4,072,817, Cl. 174-52.00H.
Waldron, Clifford R.; Yonkers, Karl W.; Goebeler, Robert; Frear, David L.; and Bright, Edward J., to Bendix Corporation, The. Electrical contact assembly. 4,072,394, Cl. 339-276.00T.
Waldrop, Thomas W.: *See—*
Campbell, Willis R.; and Waldrop, Thomas W., 4,072,095, Cl. 100-5.000.
Walker, Alan John, to R. E. Dupont Research and Investment Services Limited. Electromagnetically driven pumps. 4,072,446, Cl. 417-420.000.
Walker, Ian Clive, to Micro Consultants Limited. Digital storage systems. 4,072,987, Cl. 360-48.000.
Wallace, Charles H.: *See—*
Sumption, Richard F.; and Wallace, Charles H., 4,071,957, Cl. 33-174.00L.
Wallner, Peter, to Schurter AG. Bayonet connection between two electrically conductive components. 4,072,385, Cl. 339-88.00R.
Wallo, William H., to Perfection Enterprises, Inc. Solid shell phonoconnectors. 4,072,386, Cl. 339-91.00R.
Walraevens, Rene: *See—*
Boulet, Jean-Claude; Walraevens, Rene; Bonnety, Gerard; Lolivier, Jacques; and Trouillet, Paul, 4,072,638, Cl. 260-2.5AP.
Walters, Thomas, Jr., to Ecolaire Incorporated. Rotary feeder. 4,072,253, Cl. 222-368.000.
Walther, Herbert; Hartig, Wolfgang; Friedrich, Adolf; and Raue, Roderich, to Bayer Aktiengesellschaft. Dyestuff laser. 4,072,911, Cl. 331-94.50L.
Waly, Adnan, to Izon Corporation. Optical scanning system for reading micro-image records. 4,072,416, Cl. 355-46.000.
Wanner, Karl, to Robert Bosch GmbH. Motor-driven portable hammer. 4,072,199, Cl. 173-131.000.
Ward, Dennis J., to UOP Inc. Process to separate hydrocarbons from gas streams. 4,072,604, Cl. 208-341.000.
Ward, Dennis J.: *See—*
Stine, Laurence O.; and Ward, Dennis J., 4,072,729, Cl. 260-671.00R.
Warren Insulated Bloc, Inc.: *See—*
Warren, Millard R., 4,071,989, Cl. 52-145.000.
Warren, Millard R., to Warren Insulated Bloc, Inc. Sound insulative masonry block. 4,071,989, Cl. 52-145.000.
Waschneck, Helmut: *See—*
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Wasson, Ken G., to Spectra-Flux, Inc. Radial magnetic bearing. 4,072,370, Cl. 308-10.000.
Watanabe, Itaru; Yamakoshi, Yasumichi; Miyauchi, Hirotsugu; Tsushima, Sakae; and Fukumoto, Mitsunobu, to Asahi Kasei Kogyo Kabushiki Kaisha. Reinforced ion-exchange membrane. 4,072,793, Cl. 428-255.000.
Watanabe, Namio: *See—*
Inoue, Takehisa; Ogawa, Yutaka; Sugita, Hiroaki; and Watanabe, Namio, 4,072,217, Cl. 188-73.600.
Watanabe, Shoji: *See—*
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Watson, W. Gary: *See—*
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Webley, Reginald Sidney, to EMI Limited. X-ray tube. 4,072,875, Cl. 313-60.000.
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McConnell, Richard L.; Weemes, Doyle A.; and Joyner, Frederick B., 4,072,813, Cl. 526-348.200.
Wehrli, Pius Anton, to Hoffmann-La Roche Inc. Preparation of 2,3,6-tri-lower alkyl phenols. 4,072,723, Cl. 260-621.00H.
Weigl, James: *See—*
Munson, Ramon Jon; Hurd, Claude Calvert; and Weigl, James, 4,072,148, Cl. 128-142.200.
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Muller, Werner Heinrich; Hey, Hansjorg; and Weil, Tomas, 4,072,660, Cl. 260-621.00H.
Weiland, Richard Herschel, to Boeing Company, The. Aerial refueling boom articulation. 4,072,283, Cl. 244-135.00A.
Weis, Helmut: *See—*
Bechtle, Bastian; Schuenemann, Claus; Skudelny, Gisbert; Spruth, Wilhelm; Weis, Helmut; and Zimmermann, Volker, 4,072,888, Cl. 318-685.000.
Weiss, Stefan Adam; Torney, Harry Lester; and Caldwell, William Joseph, to Dow Chemical Company, The. Production of viruses in tissue culture without use of serum. 4,072,565, Cl. 195-1.100.
Weiss, Walter J.: *See—*
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Lewis, William; Weldon, Peter J.; Hagedorn, Henry, Jr.; Hayes, Thomas E.; and Israels, Sylvan H., 4,072,108, Cl. 102-70.20R.
Welton, Sanford M., to PPG Industries, Inc. Method and apparatus for opening scores in a glass sheet. 4,072,259, Cl. 225-2.000.
Wentzheimer, William W., to Suntech, Inc. Process to make technical white oils. 4,072,603, Cl. 208-264.000.
Werner & Pfleiderer: *See—*
Lambertus, Friedrich, 4,072,459, Cl. 425-464.000.
West Electric Co., Ltd.: *See—*
Iwata, Hiroshi; and Ishikawa, Katsuji, 4,072,963, Cl. 354-31.000.
Westbrook, L. V.; and Payne, R. L., to Honeywell Inc. Voltage regulator. 4,072,890, Cl. 323-22.00R.
Western Electric Co., Inc.: *See—*
Chuss, John T.; Krechel, Henry H.; and Purvis, Joseph R., 4,071,944, Cl. 29-574.000.
Fuchs, Francis Joseph, Jr., 4,072,037, Cl. 72-261.000.
Schoenthaler, David, 4,072,777, Cl. 427-433.000.
Western Geophysical Co. of America: *See—*
Siems, Lee E.; and Morgan, Paul M., 4,072,923, Cl. 340-15.5TS.
Westinghouse Electric Corporation: *See—*
Benbow, Eugene C., 4,072,267, Cl. 235-112.000.
Buchanan, James E., 4,072,938, Cl. 340-347.0AD.
Coviello, John W., 4,072,818, Cl. 358-284.000.
Emark, Lawrence W., Jr., 4,072,885, Cl. 318-600.000.
Engel, Joseph C.; and Saletta, Gary F., 4,072,878, Cl. 315-205.000.
Kramer, William E.; Hopkins, Richard H.; and Hoffman, Richard A., 4,072,782, Cl. 428-409.000.
Lloyd, Wayne B.; and Staehlin, John H., 4,072,064, Cl. 74-409.000.

Moeglich, Karl, 4,072,596, Cl. 204-241.000.
Noonan, Charles M., 4,072,795, Cl. 428-379.000.
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Tanaka, Tadashi; Okamoto, Akira; Kouno, Takashi; Kramer, William E.; Hopkins, Richard H.; and Hoffman, Richard A., 4,072,657, Cl. 260-47.0UA.
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Westport International: *See—*
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Westvaco Corporation: *See—*
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WGW Westdeutsche Getriebe- und Kupplungswerke GmbH: *See—*
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White, Donald A.: *See—*
Hallcher, Richard C.; Baizer, Manuel M.; and White, Donald A., 4,072,583, Cl. 204-59.00R.

White, James F.; Shaw, Wilfrid G.; and Applequist, Michael D., to Standard Oil Company, The. Process for the preparation of unsaturated acids from unsaturated aldehydes. 4,072,708, Cl. 260-530.00N.

White, Lionel Stuart, Jr.: *See—*
Kitagawa, Norihisa; and White, Lionel Stuart, Jr., 4,072,932, Cl. 365-233.000.

Whitehead, Robert C., Jr., to Honeywell Inc. Differential pressure transmitter with pressure sensor protection. 4,072,058, Cl. 73-720.000.

Whitehurst, Darrell Duayne: *See—*
Haag, Werner O.; and Whitehurst, Darrell Duayne, 4,072,720, Cl. 260-618.00H.

Wiart, Albert Charles; and de la Jonquiere, Pierre Jacques, to Jeumont-Schneider. Frequency current converter for energizing an AC machine. 4,072,882, Cl. 318-227.000.

Wicks, Anthony John; and Wilson, Eric Terence, to Wicks & Wilson Limited. Microfilm card duplication. 4,072,420, Cl. 355-100.000.

Wicks & Wilson Limited: *See—*
Wicks, Anthony John; and Wilson, Eric Terence, 4,072,420, Cl. 355-100.000.

Wickwire, Chester F. Arch and building construction. 4,071,985, Cl. 52-86.000.

Wickwire, Chester F. Building structure. 4,071,986, Cl. 52-86.000.

Widmer, Erich: *See—*
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Wiebe, Donald, to A. Stucki Company. Resiliently biasing truck pedestal bearing retention assembly. 4,072,112, Cl. 105-221.00K.

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Wiesler, Mordechai. Digital weighing machine. 4,072,201, Cl. 177-210.00R.

Wilder, Joseph, to Sangamo Weston, Inc. Industrial system for inspecting and identifying workpieces. 4,072,928, Cl. 340-146.30H.

Wilhelm, Daniel C.: *See—*
Claypoole, Stewart A.; and Wilhelm, Daniel C., 4,072,400, Cl. 350-96.300.

Wilke, Charles R.: *See—*
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Wilkinson, Ralph A.: *See—*
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Willems, Jozef Frans: *See—*
Sels, Jeanne Francis Jeanne; Pollet, Robert Joseph; Vandeputte, Camille Angelina; and Willems, Jozef Frans, 4,072,526, Cl. 96-66.300.

William Machinery Limited: *See—*
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Williams, Barney V. Vertical rising boat lift. 4,072,119, Cl. 114-45.000.

Williams, David J.: *See—*
Pearson, James M.; Williams, David J.; and Limburg, William W., 4,072,519, Cl. 96-1.50R.

Williams, Dennis A.; and Carswell, Robert, to Dow Chemical Company, The. Ester lubricants containing polyoxyalkylene phenothiazines. 4,072,619, Cl. 252-47.500.

Williams, Joseph James: *See—*
Dabal, Dennis Joseph; and Williams, Joseph James, 4,072,551, Cl. 156-378.000.

Williams, Wilmore, to Beatrice Foods Co. Preparation of a tuberculosis test medium by reconstituting a storage stabilized dry powdered Lowenstein-Jensen medium. 4,072,570, Cl. 195-100.000.

Wilson, Charles R., to Westinghouse Electric Corporation. Electroacoustic transducer. 4,072,871, Cl. 310-333.000.

Wilson, Edward A.; and Fredenberg, James D., to Honeywell Information Systems Inc. Fluid cooling systems for electronic systems. 4,072,188, Cl. 165-80.000.

Wilson, Eric Terence: *See—*
Wicks, Anthony John; and Wilson, Eric Terence, 4,072,420, Cl. 355-100.000.

Wilson, James Ellsworth: *See—*
Conant, Louis A.; Bolton, Wilbur Monroe; and Wilson, James Ellsworth, 4,072,243, Cl. 215-12.00R.

Wilson, Jerry Lee. Multi-purpose exercise device. 4,072,309, Cl. 272-136.000.

Wilson, Richard J.: *See—*
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Winderl, Siegfried: *See—*
Voges, Dieter; Baer, Karl; Boudier, Juergen; Winderl, Siegfried; and Hoffmann, Herwig, 4,072,714, Cl. 260-584.00R.

Winer, Richard, to Hercules Incorporated. Use of graphite fibers to augment propellant burning rate. 4,072,546, Cl. 149-19.800.

Wines, Roy Layton, Jr.; and Wines, Roy Layton, III, to Roy L. Wines & Son, Inc. Portable nursing device. 4,072,157, Cl. 134-58.00R.

Wines, Roy Layton, III: *See—*
Wines, Roy Layton, Jr.; and Wines, Roy Layton, III, 4,072,157, Cl. 134-58.00R.

Winkler, Alfred, to AGFA-Gevaert Aktiengesellschaft. Still camera. 4,072,970, Cl. 354-187.000.

Winter, George R., III, to UOP Inc. Process for alkylating aromatic hydrocarbons. 4,072,730, Cl. 260-671.00R.

Wirges, Winfried; and Freitag, Herbert, to Stabilus GmbH. Chair with pneumatically adjustable seat height and back support inclination. 4,072,288, Cl. 248-404.000.

Wit-Son Carbide Tool, Inc.: *See—*
Kulson, Walter A., 4,072,476, Cl. 51-215.00H.

Witmer, Kurt; and Cachin, Roland, to Dr. K. Witmer Elektronik AG. Electronically stabilized feeder device for the supply of DC current. 4,072,889, Cl. 323-9.000.

Wittenmyer, James D. Dual standpipe arrangement supplementing a water supply system. 4,072,168, Cl. 137-567.000.

Wohlfarth, Ernst: *See—*
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Wolf, Bobby G. Implement, especially for lawn work. 4,072,436, Cl. 404-122.000.

Wolf, Chester: *See—*
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Wolf, William D., to Monsanto Company. Method for production of hollow articles from injection molded preforms using insulated runner system. 4,072,737, Cl. 264-97.000.

Wolfe, George Edwin: *See—*
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Woltmann, Ivan Elmer: *See—*
Kenworthy, Milton James; and Woltmann, Ivan Elmer, 4,072,008, Cl. 60-261.000.

Wood, Gillies: *See—*
Harlow, David Arthur; and Wood, Gillies, 4,072,029, Cl. 66-154.00R.

Woodley, Ralph M.: *See—*
Groswith, Charles T., III; and Woodley, Ralph M., 4,072,326, Cl. 281-29.000.

Woodstream Corporation: *See—*
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B 24,017	3,914,140	Oct. 21, 1975	B 287,275	3,925,141	Dec. 9, 1975
B 24,018	3,914,206	Oct. 21, 1975	B 287,373	3,918,568	Nov. 11, 1975
B 64,868	3,914,141	Oct. 21, 1975	B 288,018	3,925,239	Dec. 9, 1975
B 78,331	3,914,142	Oct. 21, 1975	B 288,627	3,916,179	Oct. 28, 1975
B 112,422	3,913,484	Oct. 21, 1975	B 288,638	3,925,132	Dec. 9, 1975
B 150,560	3,913,654	Oct. 21, 1975	B 289,175	3,924,309	Dec. 9, 1975
B 176,995	3,915,773	Oct. 28, 1975	B 289,471	3,917,184	Nov. 4, 1975
B 178,475	3,944,602	Mar. 16, 1976	B 289,523	3,921,166	Nov. 18, 1975
B 189,772	3,925,367	Dec. 9, 1975	B 289,883	3,925,063	Dec. 9, 1975
B 189,773	3,925,405	Dec. 9, 1975	B 290,328	3,924,838	Dec. 9, 1975
B 190,679	3,925,346	Dec. 9, 1975	B 291,104	3,925,007	Dec. 9, 1975
B 198,810	3,916,043	Oct. 28, 1975	B 291,694	3,925,339	Dec. 9, 1975
B 204,161	3,924,605	Dec. 9, 1975	B 292,054	3,915,877	Oct. 28, 1975
B 207,272	3,914,123	Oct. 21, 1975	B 292,126	3,914,465	Oct. 21, 1975
B 211,786	3,914,300	Oct. 21, 1975	B 292,140	3,914,340	Oct. 21, 1975
B 213,211	3,925,269	Dec. 9, 1975	B 292,300	3,927,167	Dec. 16, 1975
B 220,683	3,914,471	Oct. 21, 1975	B 292,563	3,923,653	Dec. 2, 1975
B 222,188	3,914,739	Oct. 21, 1975	B 293,378	3,923,725	Dec. 2, 1975
B 223,621	3,925,526	Dec. 9, 1975	B 293,437	3,913,414	Oct. 21, 1975
B 224,323	3,925,476	Dec. 9, 1975	B 294,103	3,924,396	Dec. 9, 1975
B 233,383	3,925,424	Dec. 9, 1975	B 294,579	3,916,737	Nov. 4, 1975
B 233,741	3,925,326	Dec. 9, 1975	B 294,673	3,916,023	Oct. 28, 1975
B 235,011	3,925,086	Dec. 9, 1975	B 295,481	3,921,593	Nov. 25, 1975
B 235,925	3,924,949	Dec. 9, 1975	B 295,674	3,916,107	Oct. 28, 1975
B 236,609	3,925,187	Dec. 9, 1975	B 295,860	3,923,880	Dec. 2, 1975
B 237,953	3,924,051	Dec. 2, 1975	B 299,267	3,917,106	Nov. 4, 1975
B 239,289	3,922,711	Nov. 25, 1975	B 300,353	3,921,734	Nov. 25, 1975
B 241,433	3,923,711	Dec. 2, 1975	B 302,271	3,929,130	Dec. 30, 1975
B 245,194	3,919,179	Nov. 11, 1975	B 302,692	3,924,598	Dec. 9, 1975
B 248,916	3,920,862	Nov. 18, 1975	B 302,836	3,923,573	Dec. 2, 1975
B 251,109	3,914,148	Oct. 21, 1975	B 302,998	3,928,233	Dec. 23, 1975
B 251,635	3,914,149	Oct. 21, 1975	B 303,011	3,930,188	Dec. 30, 1975
B 252,947	3,923,803	Dec. 2, 1975	B 303,702	3,914,131	Oct. 21, 1975
B 254,211	3,917,677	Nov. 4, 1975	B 304,687	3,924,783	Dec. 9, 1975
B 254,708	3,923,878	Dec. 2, 1975	B 305,417	3,915,882	Oct. 28, 1975
B 255,756	3,923,781	Dec. 2, 1975	B 305,868	3,921,463	Nov. 25, 1975
B 256,334	3,924,988	Dec. 9, 1975	B 305,881	3,923,478	Dec. 2, 1975
B 256,936	3,925,513	Dec. 9, 1975	B 306,655	3,924,642	Dec. 9,1975
B 258,687	3,914,221	Oct. 21, 1975	B 306,829	3,925,411	Dec. 9, 1975
B 259,236	3,924,874	Dec. 9, 1975	B 306,938	3,916,050	Oct. 28, 1975
B 259,274	3,928,688	Dec. 23, 1975	B 307,677	3,915,276	Oct. 28, 1975
B 260,455	3,925,634	Dec. 9, 1975	B 308,661	3,924,349	Dec. 9, 1975
B 260,945	3,925,250	Dec. 9, 1975	B 308,892	3,919,624	Nov. 11, 1975
B 261,378	3,913,468	Oct. 21, 1975	B 309,207	3,914,743	Oct. 21, 1975
B 261,828	3,925,551	Dec. 9, 1975	B 309,499	3,922,002	Nov. 25, 1975
B 262,241	3,925,528	Dec. 9, 1975	B 309,681	3,927,374	Dec. 16, 1975
B 262,287	3,921,209	Nov. 18, 1975	B 309,755	3,919,468	Nov. 11, 1975
B 262,378	3,914,410	Oct. 21, 1975	B 309,756	3,914,136	Oct. 21, 1975
B 262,599	3,925,323	Dec. 9, 1975	B 309,860	3,922,485	Nov. 25, 1975
B 264,257	3,928,665	Dec. 23, 1975	B 310,149	3,924,705	Dec. 9, 1975
B 264,833	3,923,566	Dec. 2, 1975	B 310,271	3,923,689	Dec. 2, 1975
B 265,369	3,925,245	Dec. 9, 1975	B 310,740	3,985,686	Oct. 12, 1976
B 265,727	3,914,479	Oct. 21, 1975	B 311,313	3,925,142	Dec. 9, 1975
B 265,862	3,915,915	Oct. 28, 1975	B 311,317	3,918,975	Nov. 11, 1975
B 266,195	3,923,599	Dec. 2, 1975	B 311,413	3,925,515	Dec. 9, 1975
B 269,673	3,914,377	Oct. 21, 1975	B 311,910	3,924,357	Dec. 9, 1975
B 270,089	3,923,875	Dec. 2, 1975	B 311,977	3,925,233	Dec. 9,1975
B 271,104	3,925,400	Dec. 9, 1975	B 312,139	3,925,530	Dec. 9, 1975
B 274,945	3,924,992	Dec. 9, 1975	B 312,477	3,923,714	Dec. 2, 1975
B 275,426	3,925,168	Dec. 9, 1975	B 313,029	4,072,769	Jan. 28, 1975
B 276,271	3,916,028	Oct. 28, 1975	B 313,098	3,925,045	Dec. 9, 1975
B 276,560	3,916,030	Oct. 28, 1975	B 313,531	3,925,548	Dec. 9, 1975
B 276,993	3,948,823	Apr. 6, 1976	B 313,594	3,924,626	Dec. 9, 1975
B 277,449	3,924,048	Dec. 2, 1975	B 313,900	3,915,932	Oct. 28, 1975
B 278,491	3,921,170	Nov. 18, 1975	B 314,049	3,920,588	Nov. 18, 1975
B 278,991	3,914,469	Oct. 21, 1975	B 314,255	3,923,764	Dec. 2, 1975
B 279,583	3,923,749	Dec. 2, 1975	B 314,271	3,921,845	Nov. 25, 1975
B 280,015	3,925,378	Dec. 9, 1975	B 314,489	3,925,016	Dec. 9, 1975
B 280,395	3,919,604	Nov. 11, 1975	B 314,800	3,930,087	Dec. 30, 1975
B 281,341	3,920,643	Nov. 18, 1975	B 314,977	3,923,459	Dec. 2, 1975
B 281,943	3,924,013	Dec. 2, 1975	B 315,363	3,920,673	Nov. 18, 1975
B 282,081	3,913,483	Oct. 21, 1975	B 315,397	3,923,963	Dec. 2, 1975
B 282,252	3,924,997	Dec. 9, 1975	B 315,731	3,914,108	Oct. 21, 1975
B 282,390	3,924,576	Dec. 9,1975	B 316,014	3,920,861	Nov. 18, 1975
B 282,819	3,982,932	Sep. 28, 1976	B 316,239	3,913,546	Oct. 21, 1975
B 283,124	3,923,512	Dec. 2, 1975	B 316,422	4,016,206	Apr. 19, 1977
B 283,300	3,925,011	Dec. 9, 1975	B 316,917	3,925,494	Dec. 9, 1975
B 284,297	3,913,722	Oct. 21, 1975	B 317,080	3,925,324	Dec. 9, 1975
B 284,427	3,952,812	Apr. 27, 1976	B 317,347	3,923,552	Dec. 2, 1975
B 285,200	3,923,680	Dec. 2, 1975	B 317,624	3,925,167	Dec. 9, 1975
B 285,796	3,914,303	Oct. 21, 1975	B 318,122	4,026,905	May 31, 1977
B 286,499	3,914,129	Oct. 21, 1975	B 318,195	3,915,699	Oct. 28, 1975
B 286,614	3,924,696	Dec. 9, 1975	B 318,618	3,915,365	Oct. 28, 1975
B 286,913	3,928,696	Dec. 23, 1975	B 318,640	3,925,186	Dec. 9, 1975
B 287,164	3,914,139	Oct. 21, 1975	B 318,745	3,916,571	Nov. 4, 1975
B 287,270	3,924,825	Dec. 9, 1975	B 319,226	3,925,082	Dec. 9, 1975

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B 319,339	3,916,056	Oct. 28, 1975	B 344,479	3,924,042	Dec. 2, 1975
B 319,402	3,919,568	Nov. 11, 1975	B 345,060	3,916,018	Oct. 28, 1975
B 319,414	3,928,666	Dec. 23, 1975	B 345,384	3,916,146	Oct. 28, 1975
B 320,261	3,924,033	Dec. 2, 1975	B 345,390	3,940,343	Feb. 24, 1976
B 320,452	3,925,083	Dec. 9, 1975	B 345,422	3,914,392	Oct. 21, 1975
B 320,603	3,915,571	Oct. 28, 1975	B 345,527	3,927,365	Dec. 16, 1975
B 321,018	3,921,623	Nov. 25, 1975	B 345,567	3,913,985	Oct. 21, 1975
B 321,101	3,917,163	Nov. 4, 1975	B 346,044	3,988,405	Oct. 26, 1976
B 321,938	3,923,889	Dec. 2, 1975	B 346,145	3,913,293	Oct. 21, 1975
B 322,182	3,925,390	Dec. 9, 1975	B 346,210	3,916,142	Oct. 28, 1975
B 322,239	3,920,973	Nov. 18, 1975	B 346,350	3,915,824	Oct. 28, 1975
B 322,564	3,914,373	Oct. 21, 1975	B 346,487	3,927,406	Dec. 16, 1975
B 322,621	3,920,863	Nov. 18,1975	B 346,585	3,913,820	Oct. 21, 1975
B 322,777	3,924,382	Dec. 9, 1975	B 346,613	3,923,545	Dec. 2, 1975
B 323,127	3,923,967	Dec. 2, 1975	B 346,901	3,915,583	Oct. 28, 1975
B 323,191	3,914,566	Oct. 21, 1975	B 348,083	3,923,774	Dec. 2, 1975
B 323,203	3,916,165	Oct. 28, 1975	B 348,383	3,923,452	Dec. 2, 1975
B 323,568	3,920,536	Nov. 18, 1975	B 348,495	3,914,654	Oct. 21, 1975
B 323,666	3,924,568	Dec. 9, 1975	B 348,558	3,914,109	Oct. 21, 1975
B 324,495	3,928,664	Dec. 23, 1975	B 349,141	3,915,363	Oct. 28, 1975
B 324,503	3,928,524	Dec. 23, 1975	B 349,177	3,914,033	Oct. 21, 1975
B 324,505	3,925,294	Dec. 9, 1975	B 349,231	3,915,831	Oct. 28, 1975
B 324,739	3,924,990	Dec. 9, 1975	B 349,321	3,916,103	Oct. 28, 1975
B 324,879	3,923,538	Dec. 2, 1975	B 349,948	3,914,557	Oct. 21, 1975
B 325,102	3,924,355	Dec. 9, 1975	B 350,025	3,927,415	Dec. 16, 1975
B 325,261	3,921,304	Nov. 25,1975	B 350,143	3,924,419	Dec. 9, 1975
B 326,514	3,925,080	Dec. 9, 1975	B 350,219	3,917,802	Nov. 4, 1975
B 327,109	3,925,350	Dec. 9, 1975	B 350,245	3,914,331	Oct. 21, 1975
B 327,363	3,923,504	Dec. 2, 1975	B 350,523	3,924,726	Dec. 9, 1975
B 327,612	3,925,620	Dec. 9, 1975	B 350,589	3,927,419	Dec. 16, 1975
B 327,674	3,918,540	Nov. 11, 1975	B 350,708	3,923,871	Dec. 2, 1975
B 327,899	3,925,674	Dec. 9, 1975	B 350,843	3,915,461	Oct. 28, 1975
B 328,164	3,914,703	Oct. 21, 1975	B 351,055	3,914,074	Oct. 21, 1975
B 328,200	3,916,031	Oct. 28, 1975	B 351,218	3,914,186	Oct. 21, 1975
B 328,205	3,914,106	Oct. 21, 1975	B 351,222	3,921,179	Nov. 18, 1975
B 328,210	3,914,275	Oct. 21, 1975	B 351,348	3,923,563	Dec. 2, 1975
B 328,391	4,039,888	Aug. 2, 1977	B 351,421	3,914,733	Oct. 21, 1975
B 328,870	3,916,486	Nov. 4, 1975	B 351,493	3,914,758	Oct. 21, 1975
B 329,115	3,924,727	Dec. 9, 1975	B 351,535	3,915,239	Oct. 28, 1975
B 329,476	3,920,562	Nov. 18, 1975	B 351,665	3,919,701	Nov. 11, 1975
B 329,612	3,925,128	Dec. 9, 1975	B 351,672	3,914,000	Oct. 21, 1975
B 329,787	3,920,688	Nov. 18, 1975	B 351,735	3,913,385	Oct. 21, 1975
B 329,816	3,923,947	Dec. 2, 1975	B 351,863	3,914,700	Oct. 21, 1975
B 330,536	3,925,452	Dec. 9, 1975	B 351,883	3,924,657	Dec. 9, 1975
B 330,828	3,913,589	Oct. 21, 1975	B 351,926	3,914,133	Oct. 21, 1975
B 331,417	3,914,157	Oct. 21, 1975	B 351,939	3,913,480	Oct. 21, 1975
B 331,557	3,916,577	Nov. 4, 1975	B 352,445	3,928,746	Dec. 23, 1975
B 331,895	3,916,403	Oct. 28, 1975	B 352,934	3,913,692	Oct. 21, 1975
B 332,527	3,924,017	Dec. 2, 1975	B 352,950	3,922,590	Nov. 25, 1975
B 332,811	3,924,359	Dec. 9, 1975	B 352,965	3,921,926	Nov. 25, 1975
B 333,876	3,921,208	Nov. 18, 1975	B 353,317	3,916,446	Nov. 4, 1975
B 333,928	3,927,172	Dec. 16, 1975	B 353,387	3,924,404	Dec. 9, 1975
B 334,251	3,924,719	Dec. 9, 1975	B 353,546	3,913,273	Oct. 21, 1975
B 334,868	3,919,469	Nov. 11, 1975	B 354,008	3,925,081	Dec. 9, 1975
B 334,985	3,923,912	Dec. 2, 1975	B 354,098	3,925,547	Dec. 9, 1975
B 335,670	3,928,686	Dec. 23, 1975	B 354,145	3,927,279	Dec. 16, 1975
B 335,741	3,925,615	Dec. 9, 1975	B 354,296	3,914,580	Oct. 21, 1975
B 335,773	3,920,953	Nov. 18, 1975	B 354,510	3,928,658	Dec. 23, 1975
B 336,129	3,923,606	Dec. 2, 1975	B 354,889	3,913,204	Oct. 21, 1975
B 336,243	3,925,422	Dec. 9, 1975	B 354,979	3,914,251	Oct. 21, 1975
B 336,345	3,925,179	Dec. 9, 1975	B 355,095	3,925,656	Dec. 9, 1975
B 336,652	3,914,211	Oct. 21, 1975	B 355,269	3,914,561	Oct. 21, 1975
B 336,902	3,918,897	Nov. 11, 1975	B 355,510	3,913,704	Oct. 21, 1975
B 336,946	3,919,425	Nov. 11, 1975	B 355,595	3,925,649	Dec. 9, 1975
B 336,978	3,923,968	Dec. 2, 1975	B 355,876	3,925,685	Dec. 9, 1975
B 337,235	3,919,386	Nov. 11, 1975	B 356,032	3,928,636	Dec. 23, 1975
B 337,409	3,925,258	Dec. 9, 1975	B 356,253	3,925,025	Dec. 9, 1975
B 337,442	3,913,658	Oct. 21, 1975	B 356,602	3,927,393	Dec. 16, 1975
B 337,703	3,914,690	Oct. 21, 1975	B 356,724	3,924,586	Dec. 9, 1975
B 337,787	3,923,506	Dec. 2, 1975	B 357,039	3,924,406	Dec. 9, 1975
B 339,059	3,924,822	Dec. 9, 1975	B 357,057	3,913,738	Oct. 21, 1975
B 339,218	3,925,121	Dec. 9, 1975	B 357,131	3,924,453	Dec. 9, 1975
B 339,699	3,933,527	Jan. 20, 1976	B 357,402	3,914,180	Oct. 21, 1975
B 339,838	3,930,221	Dec. 30, 1975	B 357,682	3,924,973	Dec. 9, 1975
B 340,212	3,922,645	Nov. 25, 1975	B 357,803	3,919,470	Nov. 11, 1975
B 340,833	3,925,208	Dec. 9, 1975	B 358,174	3,924,958	Dec. 9, 1975
B 341,579	3,913,363	Oct. 21, 1975	B 358,244	3,913,411	Oct. 21, 1975
B 342,084	3,928,694	Dec. 23, 1975	B 358,311	3,923,561	Dec. 2, 1975
B 342,423	3,925,334	Dec. 9, 1975	B 358,939	3,924,713	Dec. 9, 1975
B 342,763	4,051,920	Oct. 4, 1977	B 359,174	3,914,117	Oct. 21, 1975
B 342,886	3,923,507	Dec. 2, 1975	B 359,187	3,924,525	Dec. 9, 1975
B 343,136	3,919,453	Nov. 11, 1975	B 359,540	3,915,235	Oct. 28, 1975
B 343,240	3,925,693	Dec. 9, 1975	B 359,740	3,936,212	Feb. 3, 1976
B 343,506	3,916,021	Oct. 28, 1975	B 359,791	3,929,430	Dec. 30, 1975
B 343,577	3,921,165	Nov. 18, 1975	B 359,825	3,921,344	Nov. 25, 1975
B 344,203	3,928,719	Dec. 23, 1975	B 359,946	3,914,132	Oct. 21, 1975

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JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 359,947	3,914,653	Oct. 21, 1975	B 382,018	3,929,742	Dec. 30, 1975
B 360,208	3,923,750	Dec. 2, 1975	B 382,021	3,913,212	Oct. 21, 1975
B 360,296	3,916,720	Nov. 4, 1975	B 382,261	3,914,991	Oct. 28, 1975
B 360,719	3,915,715	Oct. 28, 1975	B 382,290	3,924,717	Dec. 9, 1975
B 360,910	3,925,696	Dec. 9, 1975	B 382,783	3,919,527	Nov. 11, 1975
B 361,265	3,923,569	Dec. 2, 1975	B 382,798	3,924,435	Dec. 9, 1975
B 361,347	3,914,642	Oct. 21, 1975	B 382,840	3,922,007	Nov. 25, 1975
B 361,443	3,927,405	Dec. 16, 1975	B 383,465	3,927,412	Dec. 16, 1975
B 361,569	3,914,554	Oct. 21, 1975	B 383,581	3,925,318	Dec. 9, 1975
B 361,604	3,922,702	Nov. 25, 1975	B 383,852	3,914,246	Oct. 21, 1975
B 361,734	3,915,764	Oct. 28, 1975	B 384,499	3,925,135	Dec. 9, 1975
B 361,743	4,035,255	July 12, 1977	B 384,658	3,913,452	Oct. 21, 1975
B 361,744	4,035,254	July 12, 1977	B 384,773	3,915,416	Oct. 28, 1975
B 362,589	3,914,012	Oct. 21, 1975	B 385,210	3,913,406	Oct. 21, 1975
B 363,205	3,923,744	Dec. 2, 1975	B 386,403	3,924,895	Dec. 9, 1975
B 363,337	3,928,639	Dec. 23, 1975	B 386,592	3,925,305	Dec. 9, 1975
B 363,457	3,922,595	Nov. 25, 1975	B 387,039	3,924,510	Dec. 9, 1975
B 363,674	3,929,716	Dec. 30, 1975	B 387,331	3,913,701	Oct. 21, 1975
B 363,892	3,913,395	Oct. 21, 1975	B 387,363	3,927,378	Dec. 16, 1975
B 363,962	3,921,826	Nov. 25, 1975	B 387,687	3,918,151	Nov. 11, 1975
B 364,022	3,913,499	Oct. 21, 1975	B 387,761	3,914,245	Oct. 21, 1975
B 364,163	3,916,092	Oct. 28, 1975	B 387,790	3,925,380	Dec. 9, 1975
B 364,241	3,916,668	Nov. 4, 1975	B 387,818	3,918,935	Nov. 11, 1975
B 364,334	3,924,670	Dec. 9, 1975	B 388,580	3,923,712	Dec. 2, 1975
B 364,528	3,919,510	Nov. 11, 1975	B 389,070	3,914,171	Oct. 21, 1975
B 364,786	3,921,673	Nov. 25, 1975	B 389,295	3,914,631	Oct. 21, 1975
B 364,910	3,925,335	Dec. 9, 1975	B 389,327	3,924,504	Dec. 9, 1975
B 365,371	3,988,181	Oct. 26, 1976	B 389,639	3,914,626	Oct. 21, 1975
B 365,490	3,918,527	Nov. 11, 1975	B 389,726	3,921,010	Nov. 18, 1975
B 365,834	3,914,702	Oct. 21, 1975	B 389,807	3,922,623	Nov. 25, 1975
B 365,841	3,925,628	Dec. 9, 1975	B 389,932	3,913,268	Oct. 21, 1975
B 365,855	3,917,258	Nov. 4, 1975	B 389,933	3,913,267	Oct. 21, 1975
B 366,287	3,924,946	Dec. 9, 1975	B 390,679	3,913,668	Oct. 21, 1975
B 366,402	3,928,053	Dec. 23, 1975	B 390,732	3,913,878	Oct. 21, 1975
B 366,589	3,914,719	Oct. 21, 1975	B 390,738	4,035,343	July 12, 1977
B 367,021	3,914,752	Oct. 21, 1975	B 391,184	3,914,214	Oct. 21, 1975
B 367,040	3,924,775	Dec. 9, 1975	B 391,210	3,914,220	Oct. 21, 1975
B 367,661	3,914,158	Oct. 21, 1975	B 391,437	3,915,416	Oct. 28, 1975
B 367,739	3,923,648	Dec. 2, 1975	B 391,509	3,925,175	Dec. 9, 1975
B 367,812	3,924,789	Dec. 9, 1975	B 391,675	3,916,017	Oct. 28, 1975
B 368,081	3,924,691	Dec. 9, 1975	B 392,154	3,923,809	Dec. 2, 1975
B 368,387	3,924,923	Dec. 9, 1975	B 392,242	3,926,636	Dec. 16, 1975
B 368,392	3,913,812	Oct. 21, 1975	B 392,696	3,916,175	Oct. 28, 1975
B 368,397	3,914,677	Oct. 21, 1975	B 392,732	3,914,903	Oct. 21, 1975
B 368,862	3,925,549	Dec. 9, 1975	B 392,753	3,916,341	Oct. 28, 1975
B 369,563	3,924,449	Dec. 9, 1975	B 392,894	3,914,763	Oct. 21, 1975
B 369,607	3,923,786	Dec. 2, 1975	B 393,163	3,914,535	Oct. 21, 1975
B 369,997	3,913,533	Oct. 21, 1975	B 393,347	3,985,800	Oct. 12, 1976
B 370,453	3,964,101	Jun. 15, 1976	B 393,970	3,914,638	Oct. 21, 1975
B 370,706	3,925,242	Dec. 9, 1975	B 394,088	3,914,740	Oct. 21, 1975
B 371,073	3,930,135	Dec. 30, 1975	B 394,188	3,924,591	Dec. 9, 1975
B 371,085	3,923,783	Dec. 2, 1975	B 394,300	3,914,159	Oct. 21, 1975
B 371,787	3,921,217	Nov. 18, 1975	B 394,712	3,916,306	Oct. 28, 1975
B 371,805	3,914,433	Oct. 21, 1975	B 395,478	3,922,577	Nov. 25, 1975
B 371,836	3,923,541	Dec. 2, 1975	B 395,496	3,919,435	Nov. 11, 1975
B 372,823	3,924,660	Dec. 9, 1975	B 395,671	3,920,418	Nov. 18, 1975
B 373,051	3,914,162	Oct. 21, 1975	B 395,889	3,913,190	Oct. 21, 1975
B 373,297	3,924,436	Dec. 9, 1975	B 396,025	3,913,869	Oct. 21, 1975
B 373,326	3,920,433	Nov. 18, 1975	B 396,551	3,921,929	Nov. 25, 1975
B 373,428	3,915,511	Oct. 28, 1975	B 397,027	3,923,736	Dec. 2, 1975
B 375,220	3,920,417	Nov. 18, 1975	B 397,527	3,913,488	Oct. 21, 1975
B 375,652	3,921,303	Nov. 25, 1975	B 397,990	3,914,848	Oct. 28, 1975
B 376,504	3,914,570	Oct. 21, 1975	B 398,262	3,913,481	Oct. 21, 1975
B 376,654	3,922,513	Nov. 25, 1975	B 398,551	3,924,924	Dec. 9, 1975
B 376,742	3,924,392	Dec. 9, 1975	B 398,597	3,913,743	Oct. 21, 1975
B 376,799	3,913,955	Oct. 21, 1975	B 398,625	3,920,996	Nov. 18, 1975
B 377,172	3,918,255	Nov. 11, 1975	B 399,292	3,914,810	Oct. 28, 1975
B 377,683	3,924,433	Dec. 9, 1975	B 399,304	3,919,567	Nov. 11, 1975
B 377,833	3,913,884	Oct. 21, 1975	B 399,349	3,925,694	Dec. 9, 1975
B 377,869	3,917,002	Nov. 4, 1975	B 399,766	3,915,667	Oct. 28, 1975
B 378,621	3,923,840	Dec. 2, 1975	B 400,080	3,925,163	Dec. 9, 1975
B 379,038	3,923,994	Dec. 2, 1975	B 400,293	3,923,719	Dec. 2, 1975
B 379,172	3,914,379	Oct. 21, 1975	B 400,310	3,915,507	Oct. 28, 1975
B 379,282	3,913,462	Oct. 21, 1975	B 401,133	3,924,443	Dec. 9, 1975
B 379,955	3,913,157	Oct. 21, 1975	B 401,992	3,924,898	Dec. 9, 1975
B 380,014	3,921,915	Nov. 25, 1975	B 402,065	3,925,413	Dec. 9, 1975
B 380,141	3,925,161	Dec. 9, 1975	B 402,555	3,914,688	Oct. 21, 1975
B 380,310	3,921,048	Nov. 18, 1975	B 403,140	3,913,486	Oct. 21, 1975
B 380,312	3,913,953	Oct. 21, 1975	B 403,355	3,913,352	Oct. 21, 1975
B 380,338	3,924,873	Dec. 9, 1975	B 403,990	3,914,684	Oct. 21, 1975
B 380,446	3,923,836	Dec. 2, 1975	B 403,996	3,916,016	Oct. 28, 1975
B 380,900	3,913,307	Oct. 21, 1975	B 404,290	3,924,918	Dec. 9, 1975
B 380,926	3,925,095	Dec. 9, 1975	B 404,437	3,915,200	Oct. 28, 1975
B 381,074	3,919,583	Nov. 11, 1975	B 405,136	3,915,565	Oct. 28, 1975
B 381,632	3,914,732	Oct. 21, 1975	B 405,137	3,915,566	Oct. 28, 1975
B 381,847	3,921,152	Nov. 18, 1975	B 405,160	3,924,821	Dec. 9, 1975

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JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 405,248	3,926,294	Dec. 16, 1975
B 405,305	3,922,111	Nov. 25, 1975
B 405,360	3,913,403	Oct. 21, 1975
B 405,495	3,924,577	Dec. 9, 1975
B 405,938	3,920,109	Nov. 18, 1975
B 406,065	3,914,199	Oct. 21, 1975
B 406,357	3,924,529	Dec. 9, 1975
B 406,800	3,952,708	Apr. 27, 1976
B 407,357	3,924,614	Dec. 9, 1975
B 407,728	3,925,240	Dec. 9, 1975
B 407,736	3,924,463	Dec. 9, 1975
B 408,380	3,984,172	Oct. 5, 1976
B 408,487	3,924,046	Dec. 2, 1975
B 408,749	3,914,116	Oct. 21, 1975
B 409,026	3,925,497	Dec. 9, 1975
B 409,220	3,915,648	Oct. 28, 1975
B 409,251	3,922,620	Nov. 25, 1975
B 409,657	3,927,362	Dec. 16, 1975
B 409,816	3,921,317	Nov. 25, 1975
B 410,062	3,923,855	Dec. 2, 1975
B 410,168	3,914,717	Oct. 21, 1975
B 411,145	3,914,168	Oct. 21, 1975
B 411,356	3,919,649	Nov. 11, 1975
B 411,483	3,925,196	Dec. 9, 1975
B 411,633	3,914,741	Oct. 21, 1975
B 412,516	3,927,417	Dec. 16, 1975
B 412,619	3,925,292	Dec. 9, 1975
B 412,867	3,924,587	Dec. 9, 1975
B 413,006	3,914,850	Oct. 28, 1975
B 413,546	3,924,314	Dec. 9, 1975
B 414,129	3,925,484	Dec. 9, 1975
B 414,288	3,925,537	Dec. 9, 1975
B 415,113	3,915,717	Oct. 28, 1975
B 415,124	3,915,944	Oct. 28, 1975
B 415,845	3,925,076	Dec. 9, 1975
B 415,847	3,914,208	Oct. 21, 1975
B 415,957	3,925,635	Dec. 9, 1975
B 415,977	3,927,359	Dec. 16, 1975
B 416,598	3,923,473	Dec. 2, 1975
B 416,710	3,923,746	Dec. 2, 1975
B 416,832	3,924,975	Dec. 9, 1975
B 416,933	3,924,968	Dec. 9, 1975
B 417,299	3,918,235	Nov. 11, 1975
B 418,121	3,925,023	Dec. 9, 1975
B 418,153	3,925,251	Dec. 9, 1975
B 418,302	3,913,252	Oct. 21, 1975
B 419,327	3,921,197	Nov. 18, 1975
B 419,481	3,924,970	Dec. 9, 1975
B 420,016	3,914,572	Oct. 21, 1975
B 420,148	3,927,414	Dec. 16, 1975
B 420,514	3,923,929	Dec. 2, 1975
B 420,568	3,925,069	Dec. 9, 1975
B 421,026	3,914,785	Oct. 21, 1975
B 421,362	3,924,817	Dec. 9, 1975
B 421,383	3,925,047	Dec. 9, 1975
B 421,797	3,914,023	Oct. 21, 1975
B 422,399	3,928,656	Dec. 23, 1975
B 422,467	3,924,804	Dec. 9, 1975
B 422,949	3,921,873	Nov. 25, 1975
B 424,415	3,919,458	Nov. 11, 1975
B 424,462	3,920,522	Nov. 18, 1975
B 424,572	3,924,979	Dec. 9, 1975
B 424,748	3,924,395	Dec. 9, 1975
B 425,035	3,914,025	Oct. 21, 1975
B 425,345	3,922,015	Nov. 25, 1975
B 425,470	3,923,796	Dec. 2, 1975
B 425,539	3,916,742	Nov. 4, 1975
B 425,541	3,914,051	Oct. 21, 1975
B 425,572	3,923,822	Dec. 2, 1975
B 425,770	3,989,817	Nov. 2, 1976
B 427,631	3,921,433	Nov. 25, 1975
B 428,177	3,914,624	Oct. 21, 1975
B 428,795	3,921,056	Nov. 18, 1975
B 429,442	3,923,485	Dec. 2, 1975
B 430,106	3,918,941	Nov. 11, 1975
B 430,140	3,922,084	Nov. 25, 1975
B 430,149	4,037,175	July 19, 1977
B 430,385	4,001,104	Jan. 4, 1977
B 430,798	3,918,204	Nov. 11, 1975
B 430,944	3,922,096	Nov. 25, 1975
B 432,373	3,919,670	Nov. 11, 1975
B 433,587	3,914,567	Oct. 21, 1975
B 435,343	3,919,244	Nov. 11, 1975
B 435,844	3,925,170	Dec. 9, 1975
B 437,172	3,913,251	Oct. 21, 1975
B 437,173	3,924,627	Dec. 9, 1975
B 437,195	3,914,618	Oct. 21, 1975
B 437,450	3,922,479	Nov. 25, 1975
B 438,053	3,916,013	Oct. 28, 1975
B 438,706	3,925,050	Dec. 9, 1975
B 439,168	3,919,676	Nov. 11, 1975
B 439,669	3,921,499	Nov. 25, 1975
B 440,898	3,921,789	Nov. 25, 1975
B 441,024	3,913,629	Oct. 21, 1975
B 441,416	3,913,851	Oct. 21, 1975
B 442,280	3,914,054	Oct. 21, 1975
B 442,859	3,918,570	Nov. 11, 1975
B 442,919	3,925,483	Dec. 9, 1975
B 444,614	3,927,996	Dec. 23, 1975
B 445,471	3,914,711	Oct. 21, 1975
B 445,740	3,923,612	Dec. 2, 1975
B 447,417	4,024,727	May 24, 1977
B 448,571	3,924,760	Dec. 9, 1975
B 449,647	3,916,797	Nov. 4, 1975
B 450,499	3,920,526	Nov. 18, 1975
B 450,546	3,924,417	Dec. 9, 1975
B 450,927	3,913,844	Oct. 21, 1975
B 455,520	3,922,543	Nov. 25, 1975
B 455,775	3,914,356	Oct. 21, 1975
B 456,346	3,914,531	Oct. 21, 1975
B 459,425	3,928,773	Dec. 23, 1975
B 461,872	3,919,586	Nov. 11, 1975
B 467,684	3,915,119	Oct. 28, 1975
B 468,198	3,925,340	Dec. 9, 1975

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976
B 66,272	4,014,978	Feb. 24, 1976	Mar. 29, 1977
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977
B 141,968	4,013,442	Mar. 30, 1976	Mar. 22, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 159,570	4,036,870	Mar. 23, 1976	July 19, 1977
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 328,065	4,014,752	Mar. 30, 1976	Mar. 29, 1977
B 328,077	4,014,860	Apr. 13, 1976	Mar. 29, 1977
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 356,470	4,014,789	Mar. 23, 1976	Mar. 29, 1977
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,344	4,053,067	Feb. 3, 1976	Oct. 11, 1977
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,410	4,021,196	Mar. 30, 1976	May 3, 1977
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 441,605	4,026,862	Feb. 3, 1976	May 31, 1977
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 449,989	4,061,572	Mar. 30, 1976	Dec. 6, 1977
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976	B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976	B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977	B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976	B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 459,408	4,018,890	Mar. 23, 1976	Apr. 19, 1977	B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976	B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976	B 475,801	4,056,759	Mar. 30, 1976	Nov. 1, 1977
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977	B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976	B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976	B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976	B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976	B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977	B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976	B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976	B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977	B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977	B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976	B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977	B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976	B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976	B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976	B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976	B 478,759	4,055,681	Mar. 16, 1976	Oct. 25, 1977
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976	B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976	B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977	B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977	B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976	B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976	B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976	B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977	B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976	B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976	B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976	B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976	B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976	B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976	B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976	B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977	B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976	B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976	B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977	B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976	B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976	B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976	B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976	B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976	B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976	B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976	B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976	B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976	B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976	B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977	B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976	B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977	B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977	B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977	B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 469,228	4,052,954	Feb. 17, 1976	Oct. 11, 1977	B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976	B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976	B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976	B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977	B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976	B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976	B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976	B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976	B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977	B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976	B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977	B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977	B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977	B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976	B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976	B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976	B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976	B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976	B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977	B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976	B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976	B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976	B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976	B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976	B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977	B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977	B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976	B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976	B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976	B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976	B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976	B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976	B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976	B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977	B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 487,529	4,022,750	Mar. 30, 1976	May 10, 1977	B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976	B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976	B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976	B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976	B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977	B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976	B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976	B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976	B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977	B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977	B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976	B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976	B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976	B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977	B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976	B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976	B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976	B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976	B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976	B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976	B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976	B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976	B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976	B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976	B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976	B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976	B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977	B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976	B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976	B 501,128	4,072,723	Feb. 24, 1976	Feb. 7, 1978
B 491,711	4,053,467	Mar. 23, 1976	Oct. 11, 1977	B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976	B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976	B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976	B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976	B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977	B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976	B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976	B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977	B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976	B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976	B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977	B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976	B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976	B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977	B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976	B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977	B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977	B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976	B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977	B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976	B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976	B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 494,138	4,034,002	Mar. 23, 1976	July 5, 1977	B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976	B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977	B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976	B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 494,439	4,057,521	Apr. 13, 1976	Nov. 8, 1977	B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 494,440	4,056,502	Feb. 17, 1976	Nov. 1, 1977	B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976	B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976	B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976	B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976	B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 495,124	4,060,968	Mar. 9, 1976	Dec. 6, 1977	B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976	B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976	B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976	B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976	B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976	B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976	B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976	B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976	B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977	B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976	B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976	B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976	B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976	B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976	B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976	B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976	B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976	B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976	B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976	B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 514,839	4,033,816	Mar. 2, 1976	July 5, 1977
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976	B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977	B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977	B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976	B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976	B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976	B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976	B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976	B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976	B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976	B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976	B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977	B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976	B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977	B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976	B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976	B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976	B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976	B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977	B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976	B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976	B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976	B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976	B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976	B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977	B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977	B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976	B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977	B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976	B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976	B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976	B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976	B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976	B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976	B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976	B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976	B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976	B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977	B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976	B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976	B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976	B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976	B 537,990	4,057,651	Jan. 13, 1976	Nov. 8, 1977
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976	B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976	B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976	B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977	B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977	B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976	B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976	B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977	B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976	B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976	B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976	B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977	B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977	B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977	B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976	B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977	B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976	B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977	B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976	B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977	B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976	B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977	B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976	B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976	B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976	B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976	B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976	B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976	B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976	B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976	B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976	B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977	B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976	B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976	B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976	B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976	B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977	B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977	B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976	B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976	B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977	B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976	B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976	B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976	B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976	B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976	B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977	B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976	B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976	B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976	B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977	B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976	B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976	B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976	B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976	B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976	B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976	B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976	B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976	B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976	B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976	B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976	B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976	B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976	B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976	B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976	B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976	B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976	B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976	B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976	B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977	B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976	B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976	B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976	B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976	B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976	B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976	B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976	B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976	B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977	B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976	B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977	B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976	B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977	B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976	B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976	B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976	B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976	B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977	B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976	B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977	B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977	B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976	B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977	B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977	B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976	B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977	B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976	B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976	B 570,925	4,040,802	Mar. 23, 1976	Aug. 9, 1977
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976	B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976	B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976	B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976	B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976	B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977	B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976	B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976	B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977	B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976	B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976	B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976	B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976	B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976	B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976	B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976	B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976	B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977	B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977	B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977	B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977	B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976	B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977	B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977	B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976	B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976	B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976	B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976	B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976	B 581,564	4,036,653	Mar. 23, 1976	July 19, 1977
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976	B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976	B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977	B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977	B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 7TH DAY OF FEBRUARY, 1978

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Boyette, Gerald B.: *See*—
Sweetana, Andrew S., Jr.; Brown, Frederick J.; and Boyette, Gerald B., T967,008, Cl. 323-61.000.

Breault, Homer: *See*—
Witt, Alvin E.; and Breault, Homer, T967,003, Cl. 428-113.000.

Brown, Frederick J.: *See*—
Sweetana, Andrew S., Jr.; Brown, Frederick J.; and Boyette, Gerald B., T967,008, Cl. 323-61.000.

Brown, Robert S.; and Koch, Joseph B., to Carpenter Technology Corporation. Austenitic Ni—Fe base weld material. T967,001, 2-7-78, Cl. 75-122.000.

Carpenter Technology Corporation: *See*—
Brown, Robert S.; and Koch, Joseph B., T967,001, Cl. 75-122.000.

Caterpillar Tractor Co.: *See*—
Gale, Preston L., T967,009, Cl. 427-53.000.

Davis, Burns: *See*—
Fagerburg, David R.; Davis, Burns; and Wooten, Willis C., T967,007, Cl. 260-860.000.

Fagerburg, David R.; Davis, Burns; and Wooten, Willis C. Compositions of polyesters having fine particles of poly (1,4-cyclohexylenedimethylene terephthalate) dispersed therein. T967,007, 2-7-78, Cl. 260-860.000.

Firestone Tire & Rubber Company, The: *See*—
Smith, Robert Clarence, T967,004, Cl. 526-173.000.

Gale, Preston L., to Caterpillar Tractor Co. Method of applying a wear-resistant composite coating to an article. T967,009, 2-7-78, Cl. 427-53.000.

Hoffman, Edwin Clarence. Thermal conservation assembly for roller fuser. T967,006, 2-7-78, Cl. 219-216.000.

Koch, Joseph B.: *See*—
Brown, Robert S.; and Koch, Joseph B., T967,001, Cl. 75-122.000.

Mihara, Yuji; Sakai, Takeo; Ohmatsu, Hideki; and Sato, Akira. Spectrally sensitized silver halide photographic emulsions. T967,002, 2-7-78, Cl. 96-64.000.

Ohmatsu, Hideki: *See*—
Mihara, Yuji; Sakai, Takeo; Ohmatsu, Hideki; and Sato, Akira, T967,002, Cl. 96-64.000.

Rowland, Stanley P.: *See*—
Wade, Clinton P.; and Rowland, Stanley P., T967,005, Cl. 544-220.000.

Sakai, Takeo: *See*—
Mihara, Yuji; Sakai, Takeo; Ohmatsu, Hideki; and Sato, Akira, T967,002, Cl. 96-64.000.

Sato, Akira: *See*—
Mihara, Yuji; Sakai, Takeo; Ohmatsu, Hideki; and Sato, Akira, T967,002, Cl. 96-64.000.

Smith, Robert Clarence, to Firestone Tire & Rubber Company, The. Transparent impact polystyrene plastics of di-block copolymers. T967,004, 2-7-78, Cl. 526-173.000.

Stryjewski, Walter Anthony. Fuser roller. T967,010, 2-7-78, Cl. 432-60.000.

Sweetana, Andrew S., Jr.; Brown, Frederick J.; and Boyette, Gerald B., to Westinghouse Electric Corporation. Capacitive voltage transformer with improved ferroresonance protection device. T967,008, 2-7-78, Cl. 323-61.000.

Agriculture: *See*—
Wade, Clinton P.; and Rowland, Stanley P., T967,005, Cl. 544-220.000.

Wade, Clinton P.; and Rowland, Stanley P., to United States of America, Agriculture. Cellulose reagents incorporating T-amino groups. T967,005, 2-7-78, Cl. 544-220.000.

Westinghouse Electric Corporation: *See*—
Sweetana, Andrew S., Jr.; Brown, Frederick J.; and Boyette, Gerald B., T967,008, Cl. 323-61.000.

Witt, Alvin E.; and Breault, Homer. Flooring of wood-plastic composite. T967,003, 2-7-78, Cl. 428-113.000.

Wooten, Willis C.: *See*—
Fagerburg, David R.; Davis, Burns; and Wooten, Willis C., T967,007, Cl. 260-860.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 7TH DAY OF FEBRUARY, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bell Telephone Laboratories, Incorporated: *See*—
Chen, Yu-Ssu; Geusic, Joseph Edward; Nelson, Terence John; and Shapiro, Herbert Meyer, Re. 29,535, Cl. 365-11.000.

Chen, Yu-Ssu; Geusic, Joseph Edward; Nelson, Terence John; and Shapiro, Herbert Meyer, to Bell Telephone Laboratories, Incorporated. Single wall domain nucleator. Re. 29,535, Cl. 365-11.000.

Du Pont de Nemours, E. I., and Company: *See*—
Resnick, Paul Raphael, Re. 29,534, Cl. 260-543.00F.

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Resnick, Paul Raphael, to Du Pont de Nemours, E. I., and Company. Purification of perfluorosulfonyl fluoride perfluorovinyl ethers by thermal decomposition of unstable isomers. Re. 29,534, Cl. 260-543.00F.

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CLASS 100

3	4,072,094
5	4,072,095
53	4,072,096
100	4,072,097

CLASS 101

32	4,072,098
44	4,072,099
79	4,072,100
93.15	4,072,101
151	4,072,102
	4,072,103
248	4,072,104
288	4,072,105
425	4,072,106

CLASS 102

4	4,072,107
70.2 R	4,072,108

CLASS 104

138 R	4,072,109
148 MS	4,072,110
172 S	4,072,111

CLASS 105

221 K	4,072,112
484	4,072,113

CLASS 106

44	4,072,530
56	4,072,531
65	4,072,532
84	4,072,533
98	4,072,534
210	4,072,535
252	4,072,536
288 B	4,072,537

CLASS 112

121.12	4,072,114
205	4,072,115
286	4,072,116

CLASS 113

1 H	4,072,117
57	4,072,118

CLASS 114

45	4,072,119
72	4,072,120
90	4,072,121
230	4,072,122
254	4,072,123

CLASS 115

19	4,072,124

CLASS 116

120	4,072,125
125	4,072,126

CLASS 117

93.1 R	4,072,769

CLASS 118

2	4,072,127
3	4,072,128
629	4,072,129

CLASS 122

4 D	4,072,130

CLASS 123

8.09	4,072,131
8.13	4,072,132
52 MV	4,072,133
75 B	4,072,134
	4,072,135
	4,072,136
119 DB	4,072,137
122 E	4,072,138
127	4,072,139

CLASS 126

140	4,072,140
270	4,072,141
	4,072,142
299 D	4,072,143

CLASS 127

37	4,072,538

CLASS 128

2 S	4,072,144
2.05 D	4,072,146
2.1 E	4,072,145
006	4,072,147
142.2	4,072,148
218 NV	4,072,149
284	4,072,150
290 R	4,072,151
303.1	4,072,152
350 R	4,072,153
419 P	4,072,154

CLASS 131

140 P	4,072,155

CLASS 133

3 F	4,072,156

CLASS 134

25 R	4,072,539
58 R	4,072,157

CLASS 135

1 R	4,072,158

CLASS 136

89 SJ	4,072,541

CLASS 137

67	4,072,159
68 R	4,072,160
	4,072,161
71	4,072,162
296	4,072,163
414	4,072,164
493	4,072,165
496	4,072,166
535	4,072,167
567	4,072,168
596.13	4,072,169
599	4,072,170
599.2	4,072,171
624.2	4,072,172

CLASS 139

34	4,072,173
54	4,072,174
455	4,072,175

CLASS 140

93 R	4,072,176
105	4,072,177

CLASS 148

11.5 A	4,072,542
12 F	4,072,543
171	4,072,544
187	4,072,545

CLASS 149

19.8	4,072,546

CLASS 156

71	4,072,547
79	4,072,548
86	4,072,549
123 R	4,072,550
378	4,072,551
380	4,072,552
423	4,072,553
514	4,072,554
571	4,072,555
620	4,072,556

CLASS 157

1.17	4,072,178

CLASS 160

197	4,072,179

CLASS 162

111	4,072,557
145	4,072,558

CLASS 164

130	4,072,180
154	4,072,181

CLASS 165

1	4,072,182
11	4,072,183
18	4,072,184
30	4,072,185
43	4,072,186
48	4,072,187
80	4,072,188
142	4,072,189

CLASS 166

.5 4,072,190
261 4,072,191
273 4,072,192
280 4,072,193
295 4,072,194

CLASS 172

15 4,072,195
49 4,072,196
349 4,072,197

CLASS 173

10 4,072,198
131 4,072,199

CLASS 174

15 S 4,072,815
52 FP 4,072,816
52 H 4,072,817

CLASS 175

45 4,072,200

CLASS 176

19 LD 4,072,559
38 4,072,560
4,072,561
50 4,072,562
65 4,072,563
76 4,072,564

CLASS 177

210 R 4,072,201
229 4,072,202

CLASS 178

17.5 4,072,819
23 R 4,072,820

CLASS 179

1 GQ 4,072,821
1.5 T 4,072,822
15 AF 4,072,826
18 B 4,072,824
4,072,825
42 4,072,827
100.41 M 4,072,823
146 R 4,072,829
170.2 4,072,830
188 4,072,831

CLASS 180

9.44 4,072,203
34 4,072,204
66 R 4,072,205
105 E 4,072,206
108 4,072,207

CLASS 181

401 4,072,208

CLASS 182

116 4,072,209

CLASS 184

5 4,072,210

CLASS 185

40 R 4,072,211

CLASS 187

29 R 4,072,212

CLASS 188

1 B 4,072,213
72.4 4,072,214
4,072,215
73.3 4,072,216
73.6 4,072,217
75 4,072,218
218 XL 4,072,219

CLASS 192

075 4,072,220
098 4,072,221
131 R 4,072,222

CLASS 194

54 4,072,223

CLASS 195

1.1 4,072,565
63 4,072,566
4,072,567
65 4,072,568
80 R 4,072,569
100 4,072,570
4,072,571
4,072,572
4,072,573
103.5 M 4,072,575
103.5 R 4,072,574
4,072,576
104 4,072,577
127 4,072,578

CLASS 197

1 R 4,072,224
133 R 4,072,225

CLASS 198

345 4,072,226
370 4,072,227
459 4,072,228

CLASS 200

5 R 4,072,833
16 C 4,072,834
48 R 4,072,832
61.47 4,072,835
144 AP 4,072,836
144 B 4,072,837
148 R 4,072,838
295 4,072,839
296 4,072,840
332 4,072,841

CLASS 203

11 4,072,579
47 4,072,580

CLASS 204

15 4,072,581
54 R 4,072,582
59 R 4,072,583
73 R 4,072,584
98 4,072,585
105 M 4,072,586
110 4,072,587
129.4 4,072,589
129.43 4,072,588
157.1 R 4,072,590
159.15 4,072,592
159.2 4,072,591
192 F 4,072,593
195 R 4,072,594
219 4,072,595
241 4,072,596
243 M 4,072,597
274 4,072,598
294 4,072,599

CLASS 206

309 4,072,229
334 4,072,230
453 4,072,231
602 4,072,232
634 4,072,233

CLASS 208

120 4,072,600
134 4,072,601
138 4,072,602
264 4,072,603
341 4,072,604

CLASS 210

50 4,072,605
51 4,072,606
58 4,072,607
63 R 4,072,608
73 R 4,072,609
90 4,072,610
143 4,072,611
169 4,072,612
198 R 4,072,613
282 4,072,615
305 4,072,614
493 R 4,072,616

CLASS 211

41 4,072,234
71 4,072,235

CLASS 214

1 BB 4,072,236
6 B 4,072,237
15 E 4,072,238
35 R 4,072,239
313 4,072,240
392 4,072,241
522 4,072,242

CLASS 215

12 R 4,072,243
344 4,072,244

CLASS 219

69 C 4,072,842
91.21 4,072,843
121 EB 4,072,356
4,072,844
137.31 4,072,828
146.3 4,072,845
497 4,072,846
523 4,072,847
528 4,072,848

CLASS 220

295 4,072,245

CLASS 221

307 4,072,246

CLASS 222

47 4,072,247
56 4,072,248
95 4,072,249
326 4,072,250
333 4,072,251
341 4,072,252
368 4,072,253
391 4,072,254

CLASS 223

111 4,072,255

CLASS 224

5 D 4,072,256
29 R 4,072,257
42.21 4,072,258

CLASS 225

2 4,072,259

CLASS 226

173 4,072,260

CLASS 227

130 4,072,261

CLASS 228

265 4,072,262

CLASS 229

37 R 4,072,263
72 4,072,264

CLASS 232

35 4,072,265

CLASS 233

2 4,072,266

CLASS 235

61 NV 4,072,849
92 SB 4,072,854
112 4,072,267
303.1 4,072,852
312 4,072,853

CLASS 236

78 C 4,072,268

CLASS 239

1 4,072,269
428.5 4,072,270
541 4,072,271
676 4,072,272

CLASS 241

24 4,072,273
28 4,072,274
79 4,072,275
117 4,072,276
292.1 4,072,277

CLASS 242

96 4,072,278
192 4,072,279
195 4,072,280

CLASS 244

3.16 4,072,281
35 R 4,072,282
135 A 4,072,283
153 R 4,072,284

CLASS 248

48.2 4,072,285
154 4,072,286
399 4,072,287
404 4,072,288

CLASS 250

205 4,072,858
214 R 4,072,859
216 4,072,860
233 4,072,861
286 4,072,862
332 4,072,863
338 4,072,864
409 4,072,865
445 T 4,072,289

CLASS 251

127 4,072,290
181 4,072,291
331 4,072,292

CLASS 252

8.9 4,072,617
46.6 4,072,618
47.5 4,072,619
63 4,072,620
89 R 4,072,621
179 4,072,622
182 4,072,623
301.35 4,072,624
373 4,072,625
389 A 4,072,626
408 4,072,627
415 4,072,628
416 4,072,629
430 4,072,630
431 R 4,072,631
541 4,072,632

CLASS 254

89 R 4,072,293

CLASS 256

24 4,072,294
26 4,072,295

CLASS 260

2 N 4,072,633
2.5 A 4,072,634
2.5 AM 4,072,637
2.5 AP 4,072,638
2.5 AW 4,072,636
2.5 S 4,072,635
6 4,072,639
17.4 GC 4,072,640
18 N 4,072,641
22 CB 4,072,642
23 H 4,072,643
29.6 HN 4,072,644
29.7 H 4,072,646
29.7 M 4,072,645
31.8 R 4,072,647
33.4 PQ 4,072,648
37 N 4,072,649
42.22 4,072,650
42.44 4,072,651
45.7 P 4,072,653
45.75 B 4,072,652
45.9 QB 4,072,654
46.5 G 4,072,655
47 EN 4,072,656
47 UA 4,072,657
49 4,072,658
57 A 4,072,659
75 M 4,072,663
75 R 4,072,661
4,072,662
78 R 4,072,664
4,072,665
112 R 4,072,666
4,072,667
112.5 LH 4,072,668
123.5 4,072,669
4,072,670
4,072,671
205 4,072,672
239 A 4,072,674
239 BE 4,072,675
239.1 4,072,676
4,072,677
239.3 A 4,072,678
256.4 F 4,072,679
4,072,680
4,072,681
268 BC 4,072,682
288 R 4,072,683
290 P 4,072,684
293.69 4,072,686
293.81 4,072,685
306.7 R 4,072,688
306.7 T 4,072,687
307 R 4,072,689
326.14 R 4,072,690
326.14 T 4,072,691
327 M 4,072,692
338 4,072,693
340.9 R 4,072,694
397.1 4,072,695
397.25 4,072,697
397.6 4,072,696
408 4,072,699
438.1 4,072,700
448.8 R 4,072,701
453 AB 4,072,702
455 R 4,072,703
463 4,072,704
465 E 4,072,698
502.5 4,072,706
521 C 4,072,707
530 N 4,072,708
535 R 4,072,709
543 F Re.29,534
544 D 4,072,710
554 4,072,711
566 R 4,072,712
567.6 M 4,072,713
584 R 4,072,714
586 F 4,072,716
586 R 4,072,715
603 C 4,072,717
608 4,072,718
617 A 4,072,719
618 H 4,072,720
621 A 4,072,721
621 G 4,072,722
621 H 4,072,660
4,072,723
624 B 4,072,724
632 R 4,072,725
633 4,072,726
638 B 4,072,727
660 4,072,728
671 R 4,072,729
4,072,730
673.5 4,072,731
682 4,072,732
4,072,733
873 4,072,734
897 A 4,072,735

CLASS 261

97 4,072,736

CLASS 264

4,072,737
102 4,072,738
225 4,072,673

CLASS 266

44 4,072,298
4,072,299
50 4,072,300
60 4,072,301
245 4,072,302

CLASS 269

131 4,072,303

CLASS 270

58 4,072,304

CLASS 271

3 4,072,305
4,072,306
174 4,072,307

CLASS 272

117 4,072,308
136 4,072,309

CLASS 273

1 E 4,072,310
75 4,072,311
4,072,312
105.2 4,072,313
161 4,072,314

CLASS 274

1 E 4,072,315

CLASS 277

235 B 4,072,316

CLASS 279

1 L Re.29,533

CLASS 280

11.23 4,072,317
42 4,072,318
47.37 R 4,072,319
415 A 4,072,320
637 4,072,321
713 4,072,322
745 4,072,323
759 4,072,324
772 4,072,325

CLASS 281

29 4,072,326

CLASS 285

137 R 4,072,327
169 4,072,328
187 4,072,329
239 4,072,330

CLASS 292

173 4,072,331
228 4,072,332
292 4,072,333

CLASS 293

71 R 4,072,334

CLASS 294

93 4,072,335

CLASS 296

1 S 4,072,336
27 4,072,337
28 C 4,072,338
71 4,072,339
84 R 4,072,340

CLASS 297

27 4,072,341
84 4,072,342
93 4,072,343
180 4,072,344
184 4,072,345
217 4,072,346
385 4,072,347
386 4,072,348

CLASS 299

1 4,072,349
2 4,072,350
11 4,072,351
19 4,072,352
22 4,072,353
37 4,072,354
43 4,072,355

CLASS 301

1 4,072,357
63 PW 4,072,358

CLASS 302

34 4,072,359

CLASS 303

2 4,072,360
6 C 4,072,361
7 4,072,362
24 C 4,072,363
95 4,072,364
115 4,072,365
116 4,072,366

CLASS 307

41 4,072,866
118 4,072,867
214 4,072,868
291 4,072,869
350 4,072,870

CLASS 308

3 R 4,072,368
4 A 4,072,369
10 4,072,370
18 4,072,367
56 4,072,371
72 4,072,372
191 4,072,373

CLASS 310

53 4,072,872
71 4,072,873
268 4,072,874
333 4,072,871

CLASS 312

214 4,072,374
338 4,072,375

CLASS 313

60 4,072,875
403 4,072,876

CLASS 315

3.5 4,072,877
205 4,072,878

CLASS 318

57 4,072,879
138 4,072,881
227 4,072,880
4,072,882
257 4,072,883
314 4,072,884
600 4,072,885
602 4,072,886
675 4,072,887
685 4,072,888

CLASS 323

9 4,072,889
22 R 4,072,890

CLASS 324

16 T 4,072,891
30 B 4,072,892
61 P 4,072,896
158 T 4,072,897
208 4,072,893
221 4,072,894
238 4,072,895

CLASS 325

37 4,072,898
67 4,072,899
4,072,900
445 4,072,901
446 4,072,902
466 4,072,903

CLASS 328

39 4,072,904

CLASS 329

122 4,072,905

CLASS 330

86 4,072,906
261 4,072,907
265 4,072,908

CLASS 331

12 4,072,909
57 4,072,910
94.5 L 4,072,911
116 R 4,072,912

CLASS 333

6 4,072,913
14 4,072,914
72 4,072,915

CLASS 335

16 4,072,916

205 4,072,917
236 4,072,918
257 4,072,919
285 4,072,920

CLASS 338

61 4,072,921

CLASS 339

17 C 4,072,376
4,072,378
17 CF 4,072,380
17 F 4,072,377
17 LM 4,072,379
29 R 4,072,381
40 4,072,382
59 L 4,072,384
59 R 4,072,383
88 R 4,072,385
91 R 4,072,386
4,072,387
103 R 4,072,388
119 R 4,072,389
125 R 4,072,401
136 M 4,072,402
176 MF 4,072,390
196 R 4,072,391
258 R 4,072,392
272 UC 4,072,393
276 T 4,072,394

CLASS 340

15.5 CP 4,072,922
15.5 TS 4,072,923
52 F 4,072,924
4,072,925
58 4,072,926
4,072,927
146.3 H 4,072,928
147 A 4,072,929
152 T 4,072,930
171 R 4,072,931
229 4,072,933
243 4,072,934
259 4,072,935
274 R 4,072,936
324 M 4,072,937
347 AD 4,072,938
4,072,939
347 SY 4,072,940

CLASS 343

5 NA 4,072,941
4,072,942
6.5 LC 4,072,943
7 PF 4,072,944
7 VM 4,072,945
12 R 4,072,946
14 4,072,947
18 C 4,072,948
18 E 4,072,949
105 R 4,072,950
700 MS 4,072,951
4,072,952
713 4,072,953
4,072,954
4,072,955
844 4,072,956

CLASS 346

74.1 4,072,957
140 R 4,072,958
4,072,959

CLASS 350

33 4,072,395
46 4,072,396
61 4,072,397
96.16 4,072,399
96.23 4,072,398
96.30 4,072,400
105 4,072,403
117 4,072,404
173 4,072,405
4,072,406
241 4,072,407
255 4,072,408

CLASS 352

174 4,072,409

CLASS 353

68 4,072,410
121 4,072,411

CLASS 354

24 4,072,961
4,072,962
31 4,072,963
33 4,072,964
51 4,072,965
60 L 4,072,960
60 R 4,072,966
79 4,072,967
86 4,072,968
166 4,072,969
187 4,072,970
201 4,072,971
275 4,072,972
295 4,072,973

CLASS 355

3 CH 4,072,413
3 TR 4,072,412
4 4,072,414
14 4,072,415
46 4,072,416
67 4,072,417
75 4,072,418
83 4,072,419
100 4,072,420

CLASS 356

39 4,072,421
108 4,072,422
109 4,072,423
208 4,072,424
209 4,072,425
212 4,072,426
241 4,072,427
244 4,072,428

CLASS 357

23 4,072,974
4,072,975
4,072,976
24 4,072,977
4,072,978
36 4,072,979
38 4,072,980
46 4,072,981
49 4,072,982

CLASS 358

19 4,072,983
31 4,072,984
128 4,072,985
284 4,072,818

CLASS 360

12 4,072,986
48 4,072,987
77 4,072,990
80 4,072,989
92 4,072,991
94 4,072,992
96 4,072,988
121 4,072,993
124 4,072,994
137 4,072,995

CLASS 361

103 4,072,997
117 4,072,998
134 4,072,996
214 4,073,001
227 4,073,002
333 4,072,999
344 4,073,000

CLASS 362

2 4,072,856
101 4,072,855
123 4,072,857

CLASS 363

20 4,073,003
79 4,073,004

CLASS 364

200 4,073,005
4,073,006
424 4,072,850
487 4,072,851
508 4,073,007
602 4,073,008
4,073,009
822 4,073,010
900 4,073,011

CLASS 365

1 4,073,012
11 Re.29,535
233 4,072,932

CLASS 366

83 4,073,013
287 4,072,297
337 4,072,296

CLASS 401

146 4,072,429
265 4,072,430

CLASS 403

158 4,072,431
170 4,072,432
172 4,072,433
263 4,072,434

CLASS 404

110 4,072,435
122 4,072,436

CLASS 407

118 4,072,437

CLASS 408

59 4,072,438
90 4,072,439
112 4,072,440
204 4,072,441

CLASS 417

218 4,072,442
4,072,443
269 4,072,444
379 4,072,445
420 4,072,446

CLASS 418

36 4,072,447
60 4,072,448
87 4,072,449
133 4,072,450
178 4,072,451
266 4,072,452

CLASS 423

8 4,072,739
563 4,072,740

CLASS 424

47 4,072,742
177 4,072,743
4,072,744
200 4,072,745
263 4,072,746
267 4,072,756
4,072,757
270 4,072,747
4,072,748
273 R 4,072,749
276 4,072,750
298 4,072,751
304 4,072,752
308 4,072,705
4,072,753
4,072,754
312 4,072,755
321 4,072,758
325 4,072,741
330 4,072,759
4,072,760

CLASS 425

62 4,072,453
101 4,072,454
133.1 4,072,455
183 4,072,456
192 S 4,072,457
451.6 4,072,458
464 4,072,459
471 4,072,460
515 4,072,461

CLASS 426

387 4,072,761
510 4,072,762
513 4,072,763
558 4,072,764
596 4,072,765
607 4,072,766

CLASS 427

8 4,072,767
34 4,072,768
54 4,072,770
96 4,072,771
164 4,072,772
246 4,072,773
294 4,072,774
373 4,072,775
390 D 4,072,776
433 4,072,777

CLASS 428

52 4,072,778
139 4,072,788
195 4,072,789
220 4,072,779
4,072,790
221 4,072,791
246 4,072,792
255 4,072,793
325 4,072,780
336 4,072,781
341 4,072,783
378 4,072,794
379 4,072,795
405 4,072,796
409 4,072,782
4,072,797
507 4,072,784
536 4,072,785
537 4,072,786
594 4,072,787

CLASS 429

2 4,072,798
70 4,072,540
82 4,072,799
97 4,072,800
110 4,072,801
147 4,072,802
181 4,072,803

CLASS 526

11.2 4,072,804
43 4,072,805
48.1 4,072,807
76 4,072,808
89 4,072,806
136 4,072,809
230 4,072,810
346 4,072,811
348.2 4,072,812
4,072,813

CLASSIFICATION OF DESIGNS

D2— 309 247,136
310 247,137
247,138
320 247,139
247,140
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